

# FLIGHT

AN AIRCRAFT ENGINEER

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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## Flight

and The Aircraft Engineer

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## EDITORIAL COMMENT

**T**HE appointment of Brigadier-General Charlton to the post of Air Attaché to the British Embassy in Washington marks another milestone in the history of aviation. This is the first official announcement of an appointment of its kind, if we are not mistaken. Certainly it is the first time the British Government has taken the decision to send a flying officer to an Embassy abroad, to study and report upon the development of military aviation in the country to which he is accredited. Doubtless before very long similar appointments will be made in other countries. At least the policy will be carried out in respect of all the great aerial Powers, and we shall in time see foreign air attachés attached to the staffs of their embassies and legations in London. To the lay mind it is possible that such appointments do not convey very much, but to those inside the aerial movement they mean a great deal. For one thing, they mean that the aerial arm has come to be regarded as of equal importance to the naval or military. So much has aviation progressed and so highly specialised is it now that the work which was formerly done by the military attachés

has extended beyond their knowledge and province, and it has become necessary to appoint specialist officers to do the work. Truly we have travelled far during the last four years.

### Unfettered Air Enterprise

The debate on the Aerial Navigation Bill last week was extremely interesting from many points of view, not the least of these being the frank and progressive statements of General Seely, who is in charge of the Bill in the Lower House. Speaking in answer to Colonel Malone, who moved an amendment with the object of removing the restrictions on private enterprise, he said that he could not accept the amendment, because to do so would tend to defeat the object the Government had in view, but he nevertheless agreed with a great deal that had been said. He thought the Government ought to give the fullest possible latitude to experiment, and free it as completely as possible from inspection and State control. He was willing to give an assurance that the Air Ministry had no intention of exercising the power of inspection or registration of experimental craft or other craft built by those who were interested in aviation and who intended to use them for their own experiments in flying. That is the attitude which will give confidence to the industry and will assist to foster experiment and progress if it is persisted in, as we have no doubt it will be as long as General Seely remains the *de facto* head of the Air Ministry.

General Seely, again replying to Colonel Malone, made the interesting announcement that General Sykes, in his capacity of Controller-General of Civil Aviation, would most certainly deal with lighter-than-air as well as heavier-than-air craft. For the moment, he said, the Admiralty were principally concerned in the construction of lighter-than-air craft. We are exceedingly pleased to know this, and take leave to say that the sooner this resolution is put into actual operation the better it will be for the future development of lighter-than-air types. To put it quite mildly, the Admiralty has shown itself to be more than a little conservative in the matter of assistance to the enquiring who may be interested in the lessons that have been learnt during the War. While the progress which has been made in heavier-than-air machines has been an open book to the constructor, inasmuch as a great deal of that progress has resulted from the work of people outside the Service,

construction of airships has been practically an Admiralty monopoly, while nothing was allowed—and very properly so—to leak out during the War as to types and their success or non-success. Now that hostilities have terminated, however, there seems to be no logical reason why the essential data should not be placed at the disposal of those who are seriously desirous of entering upon the lighter-than-air side of commercial aviation. It might be as well to remind the officials of the Admiralty that, after all, the results that were achieved in the airship service during the period of the War were arrived at by the expenditure of public money, and are thus in truth the property of the nation. It goes without saying that the community at large stands to benefit by the development of the commercial airship, and that all the assistance possible should be given by the Department which alone has access to the data. There is no need to speak more plainly than this at the moment, but the hint may start a line of enquiry in the proper quarters and lead to questions in Parliament on the subsequent readings of the Bill we are discussing.

The Controller-General will supervise the new regulations for air-channels, and the arrangements for linking up this country with the Dominions. All these vast possibilities, involving both heavier and lighter-than-air craft, will come within the purview of General Sykes' department of the Ministry.

**Safeguarding Private Initiative** Lieutenant-Colonel Moore Brabazon, who seems rapidly to be making his mark in the House, moved an amendment providing that no Government certificates should be withheld from a machine simply because the plans had not been submitted to the Secretary for War. He pointed out that there was a danger of the Government controlling the design of all aircraft in this country, and if that were to be done it meant that no firm would take the initiative in starting new designs and thereby handing over to the Government their ideas for the exploitation of the new industry. There was, he said, an idea behind this Bill that unless a machine would bear the potential possibility of being turned into a war machine right away the Government would not approve the design. If that was what the Government intended, then they should say so openly and subsidise the industry. General Seely expressed himself as being in agreement with the principle embodied in the suggested amendment, but said the only doubt was the best way to achieve the results the experts were anxious to secure. He suggested that instead of putting the amendment into the Bill he should undertake to make it perfectly clear in the regulations, which would be more drastic even than the amendment. The duty of the Ministry was to see that aircraft were reasonably safe. In his judgment the divergence between civilian and war types of machines was going to be on an ever-increasing scale, and he was convinced that in five years the type of machine which would be flown for civilian transport would have diverged in a far greater degree than had a liner from a battle cruiser. The Ministry had no intention of trying to interfere with designs, and still less had they the intention of trying to make their air force a little cheaper by compelling civilians to build machines to their designs.

It is impossible to regard these assurances of General Seely's with anything but profound satisfaction. There has undoubtedly been a feeling abroad that the industry itself and the development of commercial aviation were to be kept in leading strings, and that liberty of design would be the first thing to be interfered with by the Government. And, taking a line through the attitude of numerous officials during the period of the War, we still believe that the intent existed, and that had it not been for more enlightened counsels at the head of the Air Ministry the design would have succeeded. However, it has not so succeeded, and for that we, and all interested in the future of the aviation industry, are profoundly thankful. At the same time, we would again point out that the Bill now before Parliament is a short-lived one—the resultant Act will terminate at the end of the year, and between now and then a great many things may happen. It is possible, though we trust not likely, that a less progressive man than General Seely may hold the reins of office at the Air Ministry, so that, satisfactory as the position seems to-day, there is yet need for vigilance.

**Linking Up the Empire** On the day before the debate on the third reading of the Aerial Navigation Bill, General Sykes took the opportunity, in the course of a public address, to insist upon the importance of civilian flying and to impress upon his hearers that it demands energy, foresight and enterprise. During the War this country and its Dominions attained a foremost position in aviation, and the question for the future to solve is: Can we maintain it on the civil side of the movement? As one of the most important of these is geographical position. It is the geographical position of the British Isles which has been the dominant factor in securing for us our important position in relation to sea-power and commerce. But in relation to aerial supremacy our position places us at a disadvantage. The sea, which has been a friendly frontier to us, is, so far as flying is concerned, a hostile element. It is obvious from a study of the map of the globe that Great Britain is situated at the western edge of the flying world, with the remoter Dominions at the circumference and with India and Egypt near the centre. General Sykes' view, in which we imagine most people who have studied the question will concur, is that Egypt is likely to become one of the most important flying centres. It is on the direct route to India, to Australia and to New Zealand, while the most practicable route to the Cape and to Central Africa is *via* Egypt.

It is sufficiently clear that if we are to take the lead in flying and to maintain it, commercial services will have to be heavily subsidised by the State. The figures relating to the cost of establishing overseas services are simply stupendous, and it would be impossible for private concerns to find the whole of the capital expenditure involved in beginning them. There is nothing to be afraid of in that, so far as the future success of commercial flying is concerned. The initial cost of establishing any new system of transport is of necessity extremely heavy, and this is a rule that applies with double force to such a method of commercial transport as that by the air. Such services as we all have in mind must and will be established, and the only question we have to answer is: Are we going to do it, or are we going to

## Flight—And the Men



Brigadier-General L. E. O. CHARLTON, C.B., C.M.G., D.S.O., R.A.F., who has just been appointed Air Attaché at Washington. General Charlton has served right through the War; he was the first pilot to see the German concentration at Mon, and brought the news which saved the right wing of the British Army.



leave it to others and so lose our commanding position in the field of aerial navigation? In endeavouring to arrive at a just conclusion in the matter, it must not be forgotten that there is a very important political as well as a commercial side to the question. The greatest weakness of the Empire is the distance separating the Mother Country and the Dominions. We have seen in the last half century what the development of steam navigation has done to knit the Empire together. We have seen how rapid transport has helped us in the winning of the War. Without the facilities afforded by the steamship we could not have brought the forces of the Dominions to the assistance of the Allies in the fields of France, nor could we have conducted our far-flung campaigns in the remoter theatres of the War. We can hardly imagine what the course of the War might have been had we not progressed beyond the era of the sailing-ship as our

most rapid means of overseas transport. Now we have in the aeroplane and the airship a means of travel capable of outstripping the fastest steamship in even greater proportion than the latter shortens the journey in comparison with the sailing-ship. Is it possible, then, to reckon in money the benefits of shortening the distances between these islands and the remoter outposts of Empire? Obviously we cannot. We have now the opportunity of beginning the development of the Empire with all the resources of communication we have gathered together during the War. But opportunity is fleeting, and this one may be lost if our own Government and those of the Dominions fail in the realisation that it is their immediate duty to provide liberal financial help for the establishment of the aerial routes and services which are unquestionably necessary to the future prosperity—even the safety—of the Empire.



#### An R.A.F. Experimental Mail Service

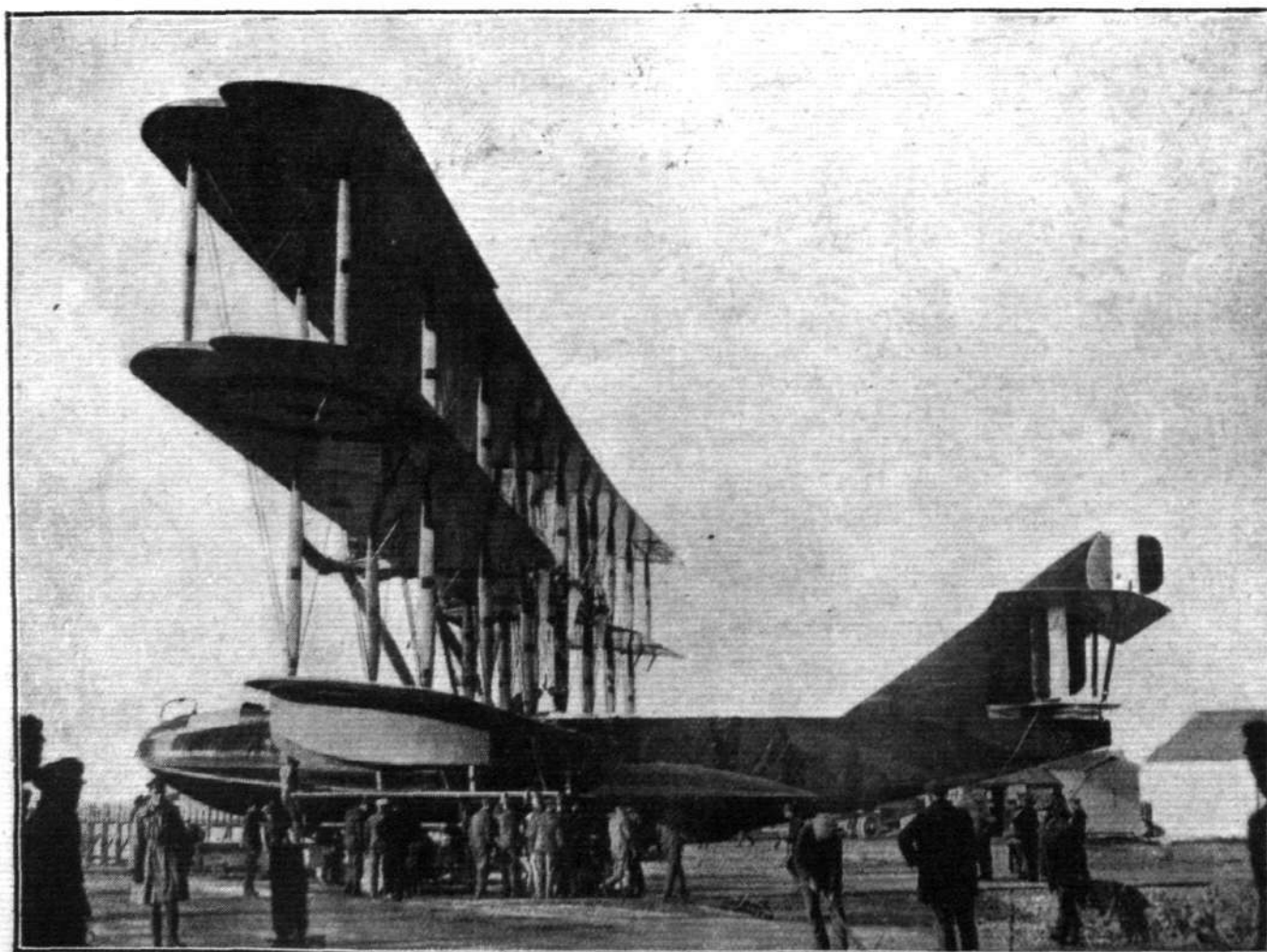
LOCAL military mail services have for a considerable time been successfully run in France by the R.A.F., and letters have been delivered regularly between Marquise and Valenciennes, Valenciennes and Namur, Valenciennes and Spa, the headquarters of the Armistice Commission, and on other routes. From December 17 to January 25 there were only five days on which no local services could be run.

This scheme has now been superseded by a more elaborate one, embracing a long-distance service from Marquise (near Boulogne), right through to Cologne, as well as an extended series of local services.

The country over which this service is being run is in places a difficult one for flying, owing to the scarcity of suitable landing places, especially among the hills between the flat country of North France and the valley of the Rhine. A chain of wireless stations has been established for the transmission of weather reports, and should a pilot be compelled

to make a forced landing he transmits his location to the nearest wireless station, and transport is quickly forthcoming to pick up the mails and to render assistance.

A chain of balloon sections has also been arranged in this service, and later it is proposed to fit these balloons for carrying signal lights and to keep them aloft by night. The balloons will thus serve as "air buoys" above the clouds, and to denote landing places, and also as aerial meteorological stations. As the intention is to maintain a night service it is also proposed to maintain on this route a chain of lighthouses. Emergency landing grounds have been located at suitable points, and have been fitted with telephonic communication. The machines will receive weather reports by wireless, by ground signal, and by balloon, the pilot thus ascertaining the conditions of the weather ahead of him. The service is an experimental one, and should not only prove a very practical test, but provide a good deal of valuable experience.



Another view of the Porte Super-Baby triplane flying boat, fitted with five Rolls-Royce Eagle engines of 400 h.p. each.



# THE POSSIBILITIES OF AIRSHIP TRANSPORT SERVICES\*

(Concluded from page 232)

## SECTION VIII.—Aerodromes, Sheds and Equipment.

At the terminal point of each airship route, it would be necessary to make provision for the following:—1. An aerodrome of about one mile square. 2. A double airship shed capable of housing two of the airships. 3. A mooring-out tower, with bow mooring gear. 4. Mechanical handling gear for transferring the airship from the mooring tower to the shed. 5. Hydrogen generating plant and storage. 6. Repair workshops and stores. 7. Meteorological office and wireless telegraphy installation. 8. Electrical night signalling and lighting arrangements for the aerodrome. 9. Offices, etc.

**Aerodrome.**—The aerodromes should be within direct communication and a short distance from the city served by the airship service, and, if possible, would be advantageously situated near to a chemical works where hydrogen could be obtained as a by-product. The ground would require to be flat and preferably on a site remote from hills and other topographical features likely to cause air disturbances.

**Sheds.**—The double sheds required to house the size of airships specified would require to have two berths, each with a minimum size of 850 ft. long, 150 ft. wide and 115 ft. high, with opening doors. The sheds would be provided with hydrogen filling mains and with gear for slinging the airships from the roof when deflated for overhaul. Special arrangements would be made to enable rapid replenishing of the ships with gas, fuel and water ballast. **Mooring-out arrangements** (see illustrations).—A mooring-out station would be provided at each aerodrome, consisting of a fixed mooring tower about 150 ft. in height, with a revolving head to which the airship would be rigidly attached by the nose and would ride clear of the ground in all weathers and be able to turn round in accordance with the direction of the wind. This tower would be provided with a hauling-in winch and rope

to haul the ship up to the mooring point. Means would be provided at this mooring tower to enable the airship to be supplied with hydrogen, fuel and water ballast whilst moored out. A lift from the ground to the top of the tower would enable passengers to embark and disembark whilst the airship is riding at the mooring, and would also serve to convey mails, freight, stores, etc., to the ship. The airship would be moored to this mast and ride out during even the worst weather, and would only require to be taken into the shed when lying up and for overhaul and repairs, etc. A diagrammatic sketch showing the scheme of mooring the ship to the mooring mast is shown below.

**Mechanical handling gear.**—Mechanical handling gear, consisting of trolleys running on guide rails from the mooring tower to the shed, with electrically driven gear, would enable the ship to be safely moved from the mooring tower to the shed with a minimum of man power.

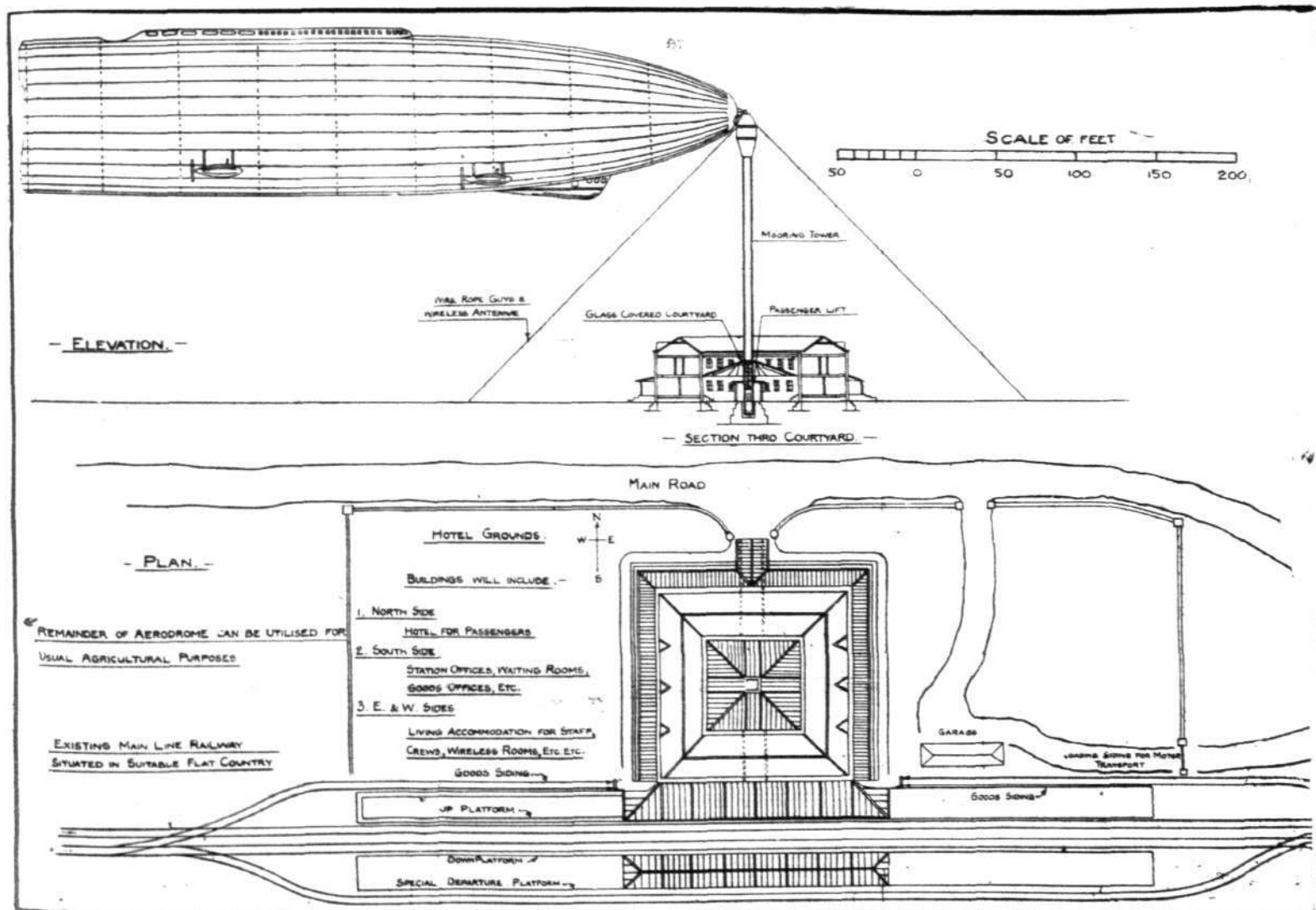
**Hydrogen generating plant and storage.**—If no industrial supply of hydrogen was conveniently situated it would be necessary to provide each aerodrome with hydrogen generating plant, with a production of say 50,000 cubic ft. per hour, and gasometer storage would require to be provided with a capacity of about 500,000 cubic ft.

**Workshops and stores.**—Workshops would be provided at the shed as necessary to carry out all overhauls and repairs to the airships, and stores would require to be provided to store spare gear and other materials required.

**Meteorological office and wireless installation.**—Each aerodrome would be provided with a meteorological office or station to issue weather reports for the guidance of airship navigators and to issue navigating instructions to them whilst on voyage by means of the wireless installation. The latter would require to have a range of at least 5,000 miles.

**Electrical night signals and lighting arrangements.**—Each

\* Issued by Vickers, Ltd.



**VICKERS PATENT MOORING GEAR FOR RIGID AIRSHIPS.**—The mooring tower, it will be seen, is built in the centre of the courtyard of the hotel, and passengers will ascend to the masthead by way of a lift. From the masthead they will enter the nose of the airship, and, passing along a corridor in the keel of the ship, will ascend to their quarters on top of the hull by a small lift passing through the ship from bottom to top.

aerodrome would be provided with suitable electric light sky signals to indicate the position of the landing ground to incoming ships at night, and the aerodrome would require to be provided with landing lights to indicate the position of the mooring tower and to give sufficient light to enable the ship to be moored.

## SECTION IX.—The Weather as Affecting Airship Service

The elements of weather that have influence on airship travel are wind, rain, hail, snow and fog. It is not likely that rain, hail, snow and fog will of themselves have much influence on airship flying. With suitable rain-proof non-absorbent outer-covering, the absorption of water and the consequent increase of weight are avoided. Hail and snow will not adhere to the ship's surface when in flight owing to the high speed through the air, and in any case, as the precipitation height is not usually more than 8,000 ft. they can be entirely avoided by flying above this height. Fog might give trouble in landing, but in flight the airship would be above the fog and not be affected by it. In landing suitable means would be taken to mark the landing place by means of captive balloons or kites, and strong searchlights could be used on the ground. At night the balloons would carry electric lights with connection from the ground. Rain, hail, snow and fog are also generally local in their occurrence, and could in any case generally be avoided by a short deviation from route. Cross-Atlantic records indicate that on the main steamship routes fog sufficient to impede navigation does not occur on more than twelve days in the year.

**Wind.**—The only important factor that need be taken into consideration is wind, but in most cases unduly strong winds can be avoided by flying at a higher level or sailing on a different course so as to avoid the storm area. As is well known there are at sea level, between certain clearly-defined latitudes, prevailing winds of constant direction, of which advantage can be taken by suitably laying out the course and route to be followed. Again, at the higher levels, there is at most latitudes a constant drift, of which advantage may be taken even if the winds at sea level are unfavourable. The following general facts which have been established from meteorological records all over the world have a great bearing on airship possibilities, viz:—1. *Heavy storms*, which are usually of a cyclonic nature, are known rarely to cover an area of more than 200 miles diameter. 2. *The rate of progression* of a cyclonic area is considerably less than the speed of air movement in the area. It is therefore obvious from the above that an airship would get clear of a cyclonic area by a deviation from her route of not more than 200 miles, and once clear of the disturbed area would have no difficulty in getting and keeping away from it.

**Prevailing winds at sea level in the North Atlantic.**—The prevailing winds north of the Equator may be clearly divided into two regions:—1. Between that part of the west coast of Africa between latitudes 30° N. and 15° N., and the American Coast from Florida to the Amazon. In this region the winds at the African coast blow from N.E. by N., and gradually become more easterly across the Atlantic, until at the American coast they are practically N.E. at the Amazon and practically E. at the Mexican Gulf. These winds are the trade winds of the old navigators, and are remarkable for their steadiness and persistency, both as regards direction and speed. The speed of these winds averages 10-15 m.p.h., and varies little from season to season. These winds are favourable for flying from east to west.

2. Between the coast of the United States from Florida and as far north as Newfoundland to Europe, from the north coast of Spain to the north of Scotland. In this region at the American coast the prevailing winds blow from almost due W. in the winter months, veering S.W. in the summer months, and gradually change in crossing the Atlantic to S.W. on the European coast in winter and almost due W. in summer. These winds are more variable than the trade winds, but are persistently westerly. Their speed is, however, more variable. The yearly average of the speed of these winds is 15 m.p.h., but they occasionally blow up to 40 m.p.h., and heavy gales are not unknown in the winter months, but these are usually of a local character. Records kept on the main Atlantic steamship routes indicate that on the average general winds of 40 m.p.h. and over do not occur on more than 20 days per annum, and the total time of duration not more than 300 hundred hours in all. Practically all the storms of 40 m.p.h. and over occur N. of latitude 45° N., that is, the latitude Bordeaux-Nova Scotia, and 60 per cent. of total number of storms in the winter months (November, December and January), only less than 10 per cent. in the summer months (May to August). The foregoing prevailing winds are clearly shown on the Atlantic Wind Chart.

**Prevailing winds at higher levels.**—Although, as stated above, precise information is available of the sea level prevailing and periodic winds at various latitudes, very little co-ordinated work appears to have been done in charting the prevailing and seasonal winds in the higher levels of the atmosphere. A great deal of work has been done in various localities in U.S.A., England and Germany, but very little is known of the winds at the higher levels over the great ocean tracts. There is no doubt a great necessity for international research on the predictions of weather conditions in the higher atmosphere, to enable advantage to be taken of these higher currents, if Atlantic flying is to become as common as Channel flying. At high altitudes, constant winds of from 30 to 40 m.p.h. are common, and if the prevailing directions of these are known to airship navigators, the duration of the journey could be considerably shortened, even by taking an indirect route, if advantage can be taken of these air currents. It is, however, undesirable to fly at great heights owing to the low temperature, but with suitable provision for heating there is no reason why flying at 10,000 ft. should not be common.

## SECTION X.—Airship Navigation

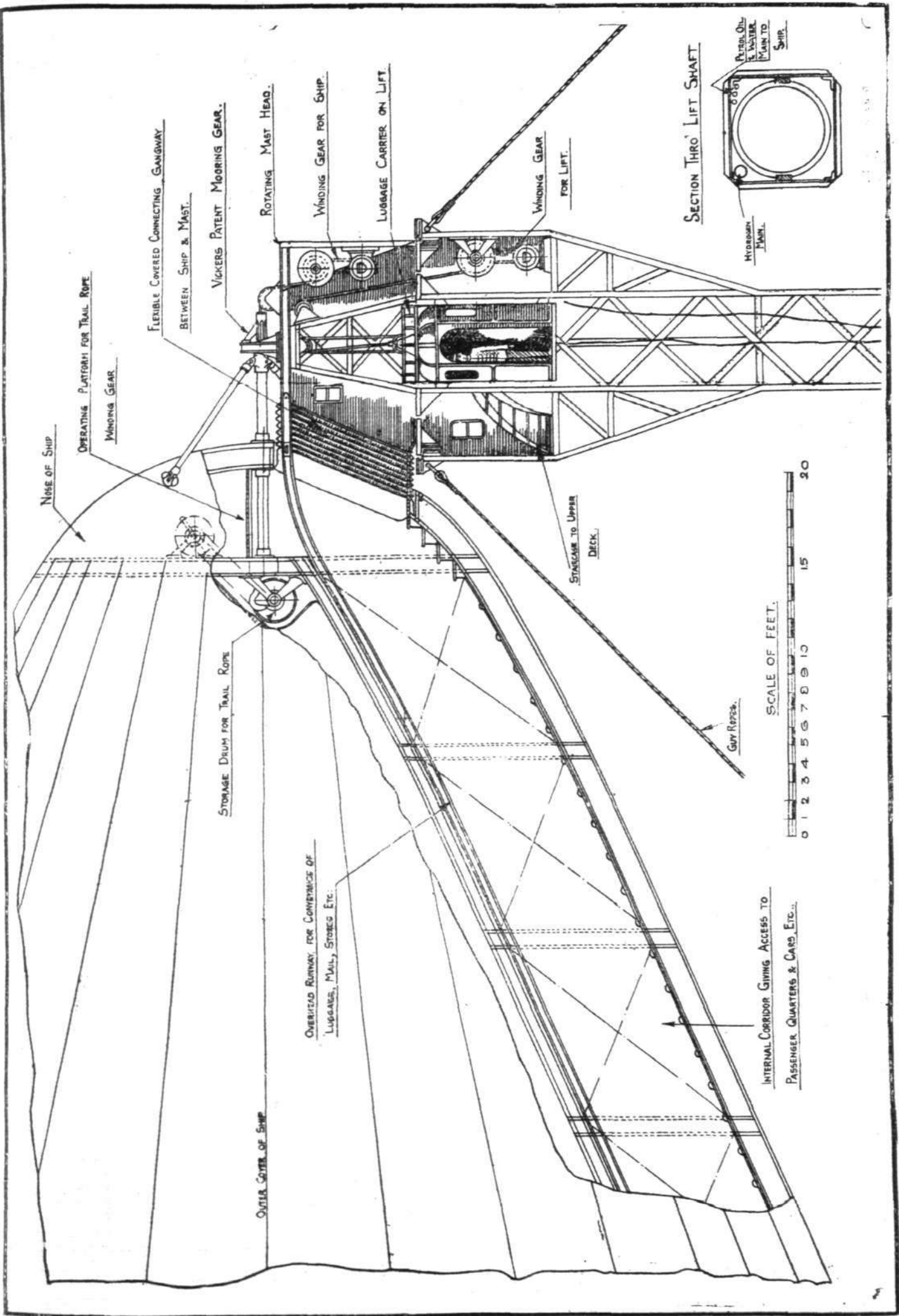
The navigation of airships is similar in principle to that of steamships, but is made more difficult by much greater drift to be allowed for. The actual course of a ship being the resultant of its own forward speed and that of the motion of the air in which it is borne, it is impossible for the navigator to plot his true course relative to the earth unless he is aware of the motion of the air. When navigating over land he is able to determine the drift of his ship by observation of a suitable fixed point on the earth's surface, and adjust his compass course accordingly to give the desired true course. Over sea, of course, no fixed point is available, so if the motion of the wind is not known, the course must be periodically corrected by astronomical observation and determination of his charted position. A reliable and effective method of navigation is, however, available with the wireless installation. If the ship is in communication with two stations they can determine the direction of the transmitted waves and signal to the ship its bearings, from which the position can be laid off on the ship's chart and the new departure determined. It is known that this method of direction was used by the German naval Zeppelin airships.

## SECTION XI.—Comparison of Airships and Aeroplanes for Long-Distance Transport

**Endurance.**—The airship of 3,500,000 cubic ft. capacity, specified in this paper for immediate use for trans-Atlantic transport, has an endurance of 80 hours at an air speed of 60 m.p.h., and can carry 15 tons of passengers and mails for an air distance of 4,800 miles at that speed. Also it would be quite a practicable proposition with present systems of design and materials of construction to build a rigid airship to carry 50 tons of passengers and freight for 10,000 miles at a speed of 80 m.p.h. as soon as developments in the demand for aerial transport justify the construction of the size of airship necessary. With a 40-ton all-metal aeroplane—which represents about the maximum size and most efficient weight-carrying type that could at present be constructed and handled—the maximum non-stop endurance of this machine would not be greater than 25 hours, carrying a load of passengers and mails of about 3 tons, at an air speed of 85 m.p.h., i.e., having a maximum air distance of 2,100 miles, and unless some radical new method of design is discovered, it is considered theoretically impossible to produce a machine on the present methods of construction even with light metal structure throughout to give an effective range of more than 2,000 miles, and then only with a relatively very small passenger load carrying capacity.

The advantage of the airship in these respects is due to the following characteristics. In the case of the airship the percentage of useful lift increases with the size of ship and the weight to power ratio decreases. In the case of the aeroplane the percentage of useful lift and the weight to power ratio increases but slightly with increase of size. It therefore may be definitely accepted that for voyages on which it is necessary to make a non-stop flight between points more than 2,000 miles distant the airship is far more economical, and further is the only means of aerial transport practicable. On the other hand, if flying over land with landing grounds provided at intervals of not more than 1,000 miles, the aeroplane can, of course, travel for indefinite distances, coming down at each landing ground for replenishment of fuel and oil. It therefore appears inevitable that the airship will hold the field for long distance cross oceanic voyages, and the aeroplane will be used for routes which may be flown in stages of a maximum distance apart of about 1,000 miles continuous flight. Carrying this de-





VICKERS PATENT MOORING GEAR FOR RIGID AIRSHIPS.—Details of the masthead, etc.

limitation further it may be concluded that the airship may be used to deal with express traffic at present dealt with by trans-oceanic liners, and the aeroplane will deal with local traffic and express traffic at present dealt with by railway trains and cross-channel steamers.

**Comfort of travel.**—With the large space available on a large rigid airship, it is quite easy to provide comfortable living and sleeping accommodation for the passengers, as described in the specification of the airship in Section VII. It is obvious that in the restricted space available on an aeroplane it is impossible to provide the same comfort and convenience for the passengers as can be provided in the large airship. Further, on the airship, there is plenty of room for the passengers to move about and take exercise by walking along the length of the inside keel or inside the top saloon of the airship, and the preparation and eating of adequate meals in comfort is easily provided for, but in an aeroplane the passengers will be restricted to a very confined space. A great advantage in comfort in travelling on an airship is attained by the comparative silence and lack of vibration due to the ship's machinery, and it is probable that in the saloon at the top of the vessel, which is remote from the engines and propellers, there will be absolute silence. On an aeroplane, on the other hand, the passengers have unavoidably to be accommodated close to the engines and propellers, and the noise will be a very serious objection.

**Safety.**—An aeroplane is entirely dependent on the proper working of the engines for its sustentation in the air, and should any of the engines break down the result would be a forced landing on the water with the consequent possibility of total loss on a rough sea. In the case of an airship the only result of the breaking down of any of the motors is the reduction in the speed, and as a speed of .8 full speed can still be maintained with even half of the motors out of action, there is no possibility of the airship being lost owing to possible failure of the engines alone. The only result would be that the arrival of the airship would be somewhat delayed owing to the reduction in speed. It may further be stated that with reduced power petrol consumption per mile run is considerably reduced, and the airship would then have an even greater reserve of endurance. It may further be noted that on an airship the machinery can be so arranged as to be perfectly accessible for repairs or replacements of the engines, whilst *en route*, and as the ship can be driven by the other engines no stoppage need be incurred for this purpose.

**Speed.**—The large type of aeroplane which will be necessary to carry an economical load for long distances will not have a speed greater than 85 to 90 m.p.h., and if it is taken into account that for long journeys an aeroplane requires to stop at a number of intermediate landing grounds for replenishment, it is apparent that the advantage of the aeroplane speed of 85 m.p.h. over the airship speed of 60 m.p.h. will not be very apparent, if any at all, and any slight advantage which there may be in this respect will disappear when the large type of airship is used which can easily have a cruising speed of 75 to 80 m.p.h. For the airship service, London to New York direct, the time is 50 hours, and with the aeroplane service, London-Ireland-New Foundland-New York the time taken is at least 46 hours, and it is probable that in service the times would be about the same.

**Cost of service.**—As a basis of comparison of cost of operation of comparative trans-Atlantic services by airship and aeroplane, it has been assumed that there will be a constant average traffic of 30 tons total load of passengers, mails or freight required to be transported each direction per week, and that both services are run to meet this demand. The estimate of the cost of airship service is given in Section V, and aeroplane service in Section XII. The results may be compared as follows:—

	Airship Service.	Aeroplane Service.
Capital required ..	£2,600,000	£3,850,000
Passenger rate: London-New York	£48..	£115
Rate per passenger mile ..	4d.	9d.
Mails per oz., London-New York	3d.	7½d.

## SECTION XII.—Comparative Aeroplane Trans-Atlantic Service

**Route.**—There is not an aeroplane in existence capable of flying direct the 3,000 miles between London and New York, even when loaded only with the necessary pilots and crew, and 2,000 miles continuous flight represents the maximum that can be done by any existing aeroplane with crew only. It is also very improbable that a machine of even 50-tons total load, of the most

efficient type with the lightest possible metal structure will be able to fly more than 2,500 air miles with even a small number of passengers and freight. It therefore must be recognised that safe direct trans-oceanic commercial flying between points more than 2,000 miles apart by aeroplane, is an impossibility unless some entirely radical new principle of design is evolved. In order to make the Atlantic crossing by aeroplane, it will therefore be necessary to take a route allowing of intermediate landing places for replenishment of fuel, etc., with the consequent delays and necessity of additional aerodromes and equipment.

The alternative routes are:—1. London-Ireland-New Foundland-New York. The longest distance being 1,800 miles between Ireland and New Foundland, and the total distance = 3,200 miles. 2. London-Azores-New Foundland-New York. The longest distance is 1,300 miles between the Azores and New Foundland, and the total distance = 3,600 miles.

It would be possible to fly by the second route with the largest and most efficient aeroplanes now in service, but only with a very small number of passengers. In order to compare the aeroplane with the airship proposed for cross-Atlantic service we shall consider a large machine which represents the limit of possible developments in size and efficiency at present considered attainable. There are obvious disadvantages in using the London-Azores-New Foundland route for regular commercial service. It would be difficult to navigate an aeroplane in stormy weather and at night to ensure landing on the relatively small Azore islands, and there would be great danger of the reserve petrol being consumed before being able to strike the islands and being forced to alight on the sea. There are also objections to having to make two landings during the voyage owing to the loss of time in landing and getting away again, but with an aeroplane this is unavoidable. It is therefore considered that the only practical route for regular use is the London-Ireland-New Foundland route, and we shall therefore, for comparison with the airship, consider a machine large enough to carry a commercial load on this route:—

Maximum direct distance, 1,800 miles. To give a safety reserve of 25 per cent. the machine must carry fuel and oil for 2,250 miles. This would allow of flying against an average head-wind of 15 m.p.h. for the whole distance.

**Particulars of machine required.**—Total load, 40 tons (90,000 lbs.); useful lift (fuel, oil and passengers, etc.), 20 tons (45,000 lbs.); maximum b.h.p. (4,000 b.h.p.); maximum speed flying at 5,000 ft., 85 m.p.h.; fuel consumption, .45 lb. b.h.p. hour; oil consumption, .03 lb. per b.h.p. hour. Assuming that the power is reduced and engines cut out so as to maintain a constant load-power ratio, as weight is reduced by consumption of fuel, the weight of fuel and oil required for 2,250 miles (26.5 hours at 85 m.p.h.) is 39,000 lbs. This leaves for passengers and crew 6,000 lbs.

**Crew required:—**

3 pilots .. .. .	} Taking watches of 4 hours on and 8 hours off.
3 engineers .. .. .	

1 steward.

Total crew .. .. . 7 men.

Weight at 160 lbs. per man .. .. . } Total 190 × 7 =  
Personal effects at 20 lbs. per man .. .. . } 1,330 lbs.  
Food at 10 lbs. per man .. .. . }

This leaves for passengers, mails, etc. .. .. . 4,670 lbs. = 2.1 tons.

Passenger weight at 170 lbs. per man .. .. . } 235 lbs.  
Personal baggage at 50 lbs. per man .. .. . } per man.  
Food, etc., at 15 lbs. per man .. .. . }

Number of passengers that can be carried, 20.

**Service.** Time taken for crossing:—

London-Ireland .. .. .	300 miles = 3½ hrs.
Ireland-New Foundland .. .. .	1,800 miles = 21½ hrs.
New Foundland-New York .. .. .	1,100 miles = 13 hrs.
Total time in air .. .. .	38 hours.

Allowing two hours at the Ireland Station and six hours at New Foundland for landing, re-filling and getting away, the total time for the journey would be 46 hours. It would, therefore, allowing time for overhaul, etc., be possible for a machine to make two crossings per week.

Thus, to give the same service as the airship service proposed, *i.e.*, 30 tons of passengers and mails each way per week, 14 aeroplanes continually in service would be required, and allowing for 100 per cent. spare machines stand-by for repairs and overhaul, total number of machines required = 28.

**Cost of running the service.**—The cost of running the service would be that necessary to cover the following charges, *viz.*:—  
1. Interest on capital required. 2. Allowances for depreciation.



tion. 3. Insurance premiums. 4. Operating expenses. 5. Repairs and maintenance.

#### 1. Capital charges :—

28 aeroplanes at £120,000 each .. ..	3,360,000
28 aeroplane sheds at £10,000 each .. ..	280,000
Land for four aerodromes .. ..	100,000
Workshops and equipments .. ..	20,000
Spare parts, etc. .. ..	100,000
Wireless equipment .. ..	10,000

Total capital required .. ..	3,860,000
Annual charge at 10 per cent. interest .. ..	386,000

2. Depreciation :—(a) Aeroplanes.—Useful life, say three years as for airships; obsolete value, say £6,000 per machine; average total depreciation per annum for 28 machines, £1,050,000. (b) Aeroplane Sheds. Life, say 20 years; scrap value in 20 years, 10 per cent.; total annual charge, £12,200. (c) Workshops and plant.—Depreciation at 3 per cent. per annum, £600. (d) Land for sheds and aerodromes.—Would not decrease in value. Total annual charge for depreciation, £1,062,800.

3. Insurance premiums.—(a) On aeroplane value at 10 per cent. per annum, £225,000; (b) on sheds and plant at 2 per cent. per annum, £5,400. Total insurance charges, £230,400.

#### 4. Annual establishment expenses :—

(a) Salaries of 36 pilots, at £600 per annum .. ..	21,600
36 engineers at £400 per annum .. ..	14,400
12 stewards, at £300 per annum .. ..	3,600
(b) Salaries of establishment :—	
(i) Management and staff .. ..	5,000
(ii) Workshop hands and storekeepers, etc., at 100 off .. ..	20,000
Total annual establishment expenses .. ..	64,600

#### 5. Repairs and maintenance —

(a) Sheds and plant, annual charge say .. ..	5,000
(b) Repairs and overhaul to machines .. ..	10,000
Total .. ..	15,000

#### Totals of annual charges :—

1. Interest on capital .. ..	386,000
2. Depreciation .. ..	1,062,800
3. Insurance .. ..	230,400
4. Establishment expenses .. ..	64,600
5. Repairs and maintenance .. ..	15,000

1,758,500

Cost chargeable per crossing :—1. Proportion of annual charges. 2. Cost of fuel and oil per crossing. 3. Cost of food, etc. As aeroplanes may be taken as being practically independent of weather, it is assumed that the service of 24 crossings per week is maintained for 50 weeks in the year, that is a total of 1,200 crossings :—

1. Proportion of annual charges per crossing .. ..	1,450
2. Petrol used per trip, 28 tons at £25 per ton .. ..	700
3. Oil per trip, 2 tons at £40 per ton .. ..	80
4. Cost of food per trip for 20 passengers and crew of seven .. ..	100
	2,330



#### Air Attaché at Washington

BRIG.-GENL. L. E. O. CHARLTON, C.B., C.M.G., D.S.O., of the Royal Air Force, has been appointed as Air Attaché to the British Embassy at Washington.

#### Air Ministry Appointment

MAJ.-GENL. the Right Hon. J. E. B. SEELY, C.B., C.M.G., D.S.O., M.P., Under-Secretary of State for the Royal Air Force, has appointed Mr. Reginald Nicholson, M.P., to be his Parliamentary private secretary.

#### Tally!

REPLYING to a question in the House of Commons on February 18, Capt. Guest stated that among other things the Germans had, under the armistice, surrendered the 1,700 aeroplanes demanded.

#### A Chair of Aeronautical Engineering at Cambridge

CAMBRIDGE University, which has hitherto paid a good deal of attention to aeronautics, has received an offer of £20,000 of 5 per cent. War Stock from Mr. Emile Mond of Hyde Park Square, for the endowment of a Professorship of Aeronautical Engineering as a memorial to his son, Lieut. Francis Mond, R.F.A. and R.A.F., who was killed in action

It will be seen from the above that the direct running cost is 38 per cent. and the overhead charges 62 per cent. of the total cost. Carrying 20 passengers, the rate would be for London-New York, £115 per head, which is equivalent to 8.75d. per mile per passenger. The rate for mails would be £1,100 per ton, London to New York, or 7½d. per ounce.

#### SECTION XIII.—Pre-War German Airship Services.

It is little appreciated in this country to what an extent the rigid airship was utilised in Germany for passenger flights and services before the War. The experience and resources which enabled the Germans to develop the Zeppelin for naval work and raiding was gained by constant use of airships in civil flying. *Der Deutsche Luftfahrt Action Gesellschaft, D.E.L.A.G.* (The German Air Travel Company), was formed in 1910 and was mainly financed and managed by the Hamburg-America Line, the H.A.P.A.G. This concern ran regular passenger excursions and to a limited extent regular town to town services during the years 1910 to 1914. The following figures for number of trips and mileage are taken from the annual report of this company issued in 1912. The total number of flights in 1912 was 400. The total flights from commencement in 1910 up to time of report in 1912 are as follows :—

Name of Ship.	No. of Flights.	Hours.	Mileage.	No. of Persons Carried.
" Schwaben " .. ..	230	499	28,468	4,622
" Victoria Louise " .. ..	285	663	36,600	3,953
" Hansa " .. ..	188	418	22,960	4,007
" Sachsen " .. ..	58	133	7,820	1,335
Others .. ..				
Totals .. ..	826	1,853	102,675	17,221

From the above it will be seen that in this period 826 flights had been made and 17,221 passengers carried without any mishap. The " Sachsen " only went into commission early in 1912, hence only is shown a small number of trips. These airships had spacious passenger cabins, holding 30 passengers, fitted up in a most luxurious style with inlaid mahogany panelling, carpeted floors and comfortable arm-chairs; in general shape and style similar to a Pullman car, with large windows from which the passengers could look at the everchanging scenery, and were served with lunch or tea as required from a buffet. Owing to the novelty the company mainly confined its enterprise to short-distance pleasure excursions of two to three hours, at the rate of 100 marks (or £5), including lunch. These airships carried 30 passengers at a time, in addition to the crew of eight. The attraction was so great that places had to be booked days ahead. At the same time periodic trips were run from Berlin to Leipzig-Dresden-Munich, as will be seen from the route map which was issued with the company's prospectus. Sheds and aerodromes were built by the D.E.L.A.G. at Potsdam, Leipzig, Dresden and Munich, etc.

The company was able to make a profit, and also received a subsidy from the Government for the use of the airships for training the Army and Navy airship crews. There is no doubt that the Germans are preparing and organising for an extensive scheme of air travel, and some time ago mention was made in the Press of a company formed for an airship line from Berlin to Constantinople, stopping at Munich and Vienna.

whilst flying on the Western front on May 15 last. The Chair is to be designated the Francis Mond Professorship of Aeronautical Engineering. The Council of the Senate recommend that the offer be gratefully accepted. The proposal is viewed with favour by the Air Ministry.

#### The Services Tournament

OWING to unforeseen circumstances the Royal Naval, Military and Air Force Tournament will not take place on May 15, as previously announced. It is expected that a further statement will be made shortly.

#### Belgian Aviator Killed in England

JOSEPH CHRISTIAENS, who before the war was well known as a driver of racing cars and also as a skilful air pilot, was killed at Wolverhampton on Tuesday afternoon. He was engaged at the Sunbeam Motor Works, and with a mechanic was driving a racing car near the works, when as is thought, the front tyre burst, and the car skidded and turned turtle. Christiaens, who was pinned beneath it, died not long after he had been removed to a hospital. The mechanic was injured but not seriously.

# THE ROYAL AERO CLUB OF THE U.K.

## OFFICIAL NOTICES TO MEMBERS.

### SPECIAL COMMITTEE MEETING

A SPECIAL MEETING of the Committee was held on Tuesday, the 18th inst., when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F., Brig.-Gen. E. M. Maitland, D.S.O., R.A.F., Lieut.-Col. Alec Ogilvie, R.A.F., and Lieut.-Com. H. E. Perrin, R.N.V.R., Secretary.

**Election of Members.**—The following New Members were elected:—

Capt. Wilfred Gordon Aston, R.A.F.  
Lieut. Arthur Charles Bray, R.N.V.R.  
Lieut.-Col. Whiston Alfred Bristow, R.A.F.  
Major John Henry D'Albiac, D.S.O., R.A.F.  
Capt. R. B. Dent (3rd Queen Alexandra's Own Gurkha Rifles).  
Major James Brian Patrick Ferrand, R.A.F.  
Major William Edward Gardner, R.A.F.  
Harry George Hawker.  
Percy Robert Jackson.  
Major Harold Cowley Mills, R.A.F.  
Lieut. Rowland Moffat Old (Royal West Kent Regt.).  
Capt. Ernest Henry Pooley, R.G.A.  
Lieut. Alfred Baldwin Raper, M.P.  
Capt. Robert Churton Savery, R.A.F.  
Lieut. Edward Fisher Turner, R.N.

### Rules for Lights and Signals and Rules of the Air

Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.  
Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F.  
Lieut.-Col. A. M. Longmore, R.A.F.  
Lieut.-Col. F. K. McClean.  
Lieut.-Col. J. T. C. Moore-Brabazon, M.P.  
Col. C. R. Samson, D.S.O., R.A.F.

The report of the above Sub-Committee on the draft Rules for Lights and Signals and Rules of the Air submitted to the Club by the Air Ministry was received and approved and ordered to be forwarded to the Air Ministry.

### Aerodromes

Lieut.-Col. F. K. McClean.  
Lieut.-Col. J. T. C. Moore-Brabazon, M.P.  
Lieut.-Com. H. E. Perrin, R.N.V.R. (Secretary).

The above Sub-Committee attended two Conferences at

the Air Ministry on behalf of the Club on the subject of Aerodromes. Their report was received and approved.

### Royal Aero Club and Society of British Aircraft Constructors

The report on the recent Conferences between the Royal Aero Club and the Society of British Aircraft Constructors was received and draft agreement was approved.

### ANNUAL GENERAL MEETING

THE Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Monday, March 31, 1919, at 3, Clifford Street, New Bond Street, London, W. 1, at 6 p.m.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than 21 days before the meeting, and must be signed by at least five members. The last day for the receipt of notices of motion is Monday, March 10, 1919.

### Committee

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the Committee are:—

Lieut.-Col. John D. Dunville, R.A.F.  
Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F.  
Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.  
Lieut.-Col. A. M. Longmore, R.A.F.  
Lieut.-Col. F. K. McClean.  
Brig.-Gen. E. M. Maitland, D.S.O., R.A.F.  
The Right Hon. Lord Northcliffe.  
Lieut.-Col. Alec Ogilvie, R.A.F.  
Maj.-Gen. Sir Godfrey M. Paine, K.C.B., M.V.O.

Any two members of the Club can nominate a member to serve on the Committee, provided the consent of the member has been previously obtained. The name of the member thus nominated, with the names of his proposer and seconder, must be sent in writing to the Secretary not less than fourteen days before the Annual General Meeting. The last day for the receipt of nominations is Monday, March 17, 1919.

Offices: THE ROYAL AERO CLUB,  
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

## AIRCRAFT IN THE ZEEBRUGGE AND OSTEND BATTLES

In the despatch dated May 9, 1918, and published in the *London Gazette* last week, detailing the operations in connection with the blocking of Zeebrugge and Ostend on St. George's Day, Vice-Admiral Sir Roger Keyes includes the following reference to the R.A.F.:—

"I am much indebted to Brig.-Gen. Charles L. Lambe, C.M.G., D.S.O., commanding the 7th Brigade of the R.A.F., and Lieut.-Col. Frederick C. Halahan, M.V.O., D.S.O., in command of the Air Force under my command, for the co-operation of the 61st and 65th Wings, under Lieut.-Cols. P. F. M. Fellowes, D.S.O., and James T. Cull, D.S.O., respectively, throughout the preparation and execution of the operations. The 65th Wing was lent for the purpose by the Field-Marshal Commander-in-Chief British Armies in France. For several weeks the 61st Wing was engaged in frequent reconnaissances, and took a large number of photographs in different conditions of tide, from which photographs plans, and models were constructed. On the first occasion of attempting the operation, the 65th Wing was already committed to their attack when I was compelled by shift of wind to withdraw the sea attack. The air attack was delivered with the greatest gallantry at a low altitude, and against a tremendous anti-aircraft defence. To the intense disappointment of the 65th Wing, mist and rain made it impossible to co-operate by repeating the aerial bombardment on the night of April 22-23, but the 61st Wing and aircraft from the Guston aerodrome at Dover escorted the main force across the North Sea."

Sir Roger Keyes, besides several references to the work of aircraft, pays a tribute to the services of the late Wing-Comdr. Brock in preparing the smoke screens which played such an important part in the engagement.

In his despatch detailing the second attack on Ostend, Sir Roger Keyes says:—

"The co-operation of the Air Force, under Brig.-Gen. Charles L. Lambe, C.M.G., D.S.O., R.A.F., was of great

value during the operation. In spite of the fog the 214th Squadron (Squadron-Comdr. Herbert G. Brackley, D.S.O., D.S.C.) continued to attack in accordance with the programme until after the completion of the operation."

It is clear that the failure to seal up Ostend on the first attempt was due to the fact that the Germans had shifted the buoys, and in his report Commodore Hubert Lynes says:—

"The location of buoys by aircraft is, of course, a very high art, and can only be done with any degree of accuracy with relation to closely surrounded land (or shoal) features."

"Capt. R. Graham, D.S.O., D.S.C., R.A.F., and Capt. L. H. Slater, D.S.C., R.A.F., obtained the present position of Stroom Bank Buoy by coming down to 100 ft. and fixing the buoy with reference, for direction, to the line of eastern pier."

He also points out that "the low clouds and drizzle put all aircraft participation out of the question."

In his report on the second attack on Ostend Commodore Lynes says:—

"For days preceding the operation, rain, cloud, and mist had prevented more than the scantiest air reconnaissances, but towards sunset on the 9th, i.e., when the blockships were already steaming eastwards, an air reconnaissance announced that all the buoys off Ostend had apparently been removed. At considerable risk of having to land after dark, Squadron-Comdr. Ronald Graham, D.S.O., D.S.C., himself at once went out, returned safely, and confirmed the report."

"To realise these conditions, and the darkness due to absence of moon, and to know that the Royal Air Force carried out its whole programme is, in itself, a very high tribute to the efficiency of the air squadrons, who, under the orders of Brig.-Gen. Charles L. Lambe, C.M.G., D.S.O., took part in the operations. All our aeroplanes eventually returned to their aerodromes; some landed well to the westward, naturally under difficulties, one crashed so badly that the pilots were both severely injured."



## THE MEMORIAL SERVICE

"DEEDS of valour and acts of heroism, which fire our imagination and rouse our enthusiasm, have been of daily occurrence in this young Force. Temperate in victory, dogged in defeat, they have enhanced the untarnished reputation of British arms for chivalry and devotion. Their name liveth evermore."

These words, forming part of the brief address of the Chaplain-in-Chief of the Royal Air Force, the Rev. H. D. L. Viener, struck the note which predominated during the service held in Westminster Abbey on February 19 in memory of the officers and men of the Air Services who have fallen in the War.

The King, as General-in-Chief of the Royal Air Force, was present with Capt. Prince Albert, R.A.F., and he was met on his arrival by the Right Hon. Winston Churchill, M.P., Secretary of State for War and the Air, Maj.-Gen. J. E. B. Seely, Maj.-Gen. Sir F. S. Sykes, Maj.-Gen. Sir Godfrey M. Paine and Maj.-Gen. Sir M. Salmond. Queen Alexandra, who was unable to be present as she had desired, was represented by her Equerry, Col. Sir Arthur Davidson. Maj.-Gen. Sir Hugh Trenchard, being detained in Paris, was unable to be present.

The Abbey was filled, the greater part by relatives and friends of those who had fallen, but all branches of the R.A.F.,



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THE R.A.F. MEMORIAL SERVICE IN WESTMINSTER ABBEY.—1. The King and Prince Albert arriving. 2. Mr. Winston Churchill, Secretary of State for War and the Air. 3. The crowd lined up for the opening of the doors. 4. Major-General J. E. B. Seely, Under-Secretary of State for the Air. 5. Brigadier-General W. Alexander, C.M.G., D.S.O. 6. Major-General Sir Godfrey Paine, K.C.B., M.V.O., Inspector-General R.A.F. 7. A contingent of the R.A.F. arriving.

the Navy and the Army, as well as the services of the Allies, sent their representatives to join in this tribute to their comrades who had laid down their lives.

The music, arranged and, in part, written for the occasion by Maj. Walford Davies, Organising Director of Music, R.A.F., was rendered by the R.A.F. band and choir, conducted by him, supported by the Abbey Choir and Mr. Nicholson and Mr. Darke at the organ.

The service closed with the sounding of the "Last Post" and the singing of a verse of the National Anthem.

The following were amongst those present:—Sir W. Sutherland, representing the Prime Minister; Admiral Sims, U.S.N.; Gen. Sir John Biddle; Maj. J. L. Baird, M.P.; Lieut.-Gen. Sir David Henderson, K.C.B.; Gen. Sir William Robertson, K.C.B.; Maj.-Gen. Sir William Brancker, K.C.B.; Lieut.-Gen. Sir R. E. W. Turner; Mr. Walter Long, M.P.; Brig-

Gen. Alexander, representing Lord Weir; Lord Londonderry; Maj.-Gen. E. L. Ellington; Lord Cowdray and Lady Cowdray; Sir A. Duckham, Director-General of Aircraft Production; Sir A. Robinson, Secretary, Air Ministry; the General Officer Commanding Australian Forces in England; Hon. Sir E. Kemp, Minister of Overseas Forces, Canada; representatives of American Army, Navy, Aviation; the General Officers Commanding Royal Air Force Areas; Maj.-Gen. Fielding, G.O.C., London Area; Brig.-Gen. and Mrs. Salmond; Gen. Sir John Monash, K.C.B.; Mrs. Churchill; Lady Londonderry; Dowager Lady Londonderry; Brig.-Gen. and Mrs. Festing; Lord Cave; Admiral Lambert; the High Commissioners of Canada, United South Africa, New Zealand; the Agent-Generals for West Australia, Tasmania, Victoria; Chief Secretary, Ireland; Capt. Fuizi, Air Attaché, Italy.



# HONOURS



It was announced in a supplement to the *London Gazette* on February 21 that the King has been pleased to approve of the award of the following honours in recognition of services rendered during Naval operations carried out in conjunction with Military operations in Palestine from October to December, 1917:—

## Bar to the D.S.C.

Flt. Lieut. H. V. Worball, D.S.C., R.N.A.S. (now Capt., R.A.F.).—Carried out very successful spotting work for "Requin" off the Wadi Hesi.

## Distinguished Service Cross

Lieut. (now Lieut.-Comdr.) M. W. Ward, R.N., H.M. Monitor *Raglan*, and Flt. Lieut. (act. Flt.-Comdr.) E. J. P. Burling, R.N.A.S. (now Capt., R.A.F.).—Carried out very successful spotting work in connection with the bombardment of Deir Sineid. During this work he was attacked by a very fast hostile aeroplane, and it was only due to the extremely clever handling of his aeroplane that the machine was not destroyed.

## Anti-Aircraft Service at Home

It was announced in a supplement to the *London Gazette* on February 20 that the names of the following have been brought to the notice of the Secretary of State for War for valuable services rendered in connection with anti-aircraft services in the United Kingdom:—

Barlow, Lieut. (actg. Capt.) H. W., R.G.A.; Boreham, Temp. Capt. (actg. Maj.) G. H., R.G.A.; Brooks, Lieut. (actg. Capt.), C. D., R.G.A.; Buckle, Capt. (actg. Lieut.-Col.) C., R.G.A. (T.F.); Cousin, Capt. (actg. Maj.) A. J., R.F.A. (T.F.); Craine, Temp. Capt. L. F., N. Lan. R.; De Mahe, Maj. (Temp. Lieut.-Col.) H. H. C. M. de C. de la B., Prince, R.F.A.; Edmunds, Lieut. H. P., R.F.A. (T.F.); Hamlett, Capt. (actg. Lieut.-Col.) H. W., R.F.A. (T.F.); Hewitt, Lieut. (actg. Capt.) T. S., R.G.A. (T.F.); Hill, Lieut. (actg. Capt.) A., R.G.A. (T.F.); Hinton, Lieut. (actg. Capt.) W. H., R.F.A.; Homewood, Lieut. T. S., R.G.A. (S.R.); Ingman, Lieut. H. J., R.E. (T.F.); Jeffery, Lieut. (actg. Maj.) R., R.F.A.; Kingscote, Capt. and Bt.-Maj. (actg. Lieut.-Col.) A. R. F., M.C., R.G.A.; Lawrence, Temp. Lieut. (actg. Capt.) S., M.C., R.F.A.; Lewis, Lieut. (Temp. Capt.) O. W. H., R.G.A. (T.F.); Mills, Capt. (actg. Lieut.-Col.) H. P. F., R.G.A.; Phillips, Lieut. (actg. Capt.) E. W., R.G.A. (T.F.); Redlich, Lieut. (actg. Capt.) S., R.G.A. (S.R.); Robertson, Lieut. A. (actg. Maj.) H. G., R.G.A. (S.R.); Simon, Maj. and Bt.-Col. M. St. L., R.E.; Thompson, Lieut.-Col. W. M., D.S.O., R.E.; Thomson, Temp. Capt. (actg. Maj.) G., R.G.A.; Townsend, Maj. C. V. M., R.F.A. (T.F.); Whittaker, Temp. Capt. W. E. de B., Gen. List; Williams, Lieut. (actg. Capt.) H. H., R.G.A. (S.R.); Woods, Lieut. A., R.E. (T.F.).

Bode, 132184 Gnr. S., R.G.A. (now 444725, R.E.); Callaway, 142484 Gnr. (actg. Cpl.) A. H., R.G.A.; Coryner, 90273 Gnr. (actg. Sergt.) W. C. G., R.G.A.; Cook, 564537 Spr. (actg. L.C.) C. E., R.E.; Compeyron, 466909 Spr. P. A., R.E.; Cullen, 547144 Cpl. (actg. Sergt.) W., R.E.; Davey, 118918 Cpl. (actg. Sergt.) T. N., R.G.A.; Garlick, 149773 Bomdr. (actg. Sergt. E.), R.G.A.; Gray, 128084 Bomdr. (actg. Sergt.) T. S., R.G.A.; Hattersley, 562649 2nd Cpl. (A-Mech. S. Sgt.) A. W., R.E.; Hopkins, 118842 Cpl. (actg. Sergt.) A. W., R.G.A.; Howell, 140205 Gnr. (actg. Cpl.) E. J. W., R.G.A.; King, 564227 Spr. (actg. 2nd Cpl.) H. G., R.E.; Lasham, 166808 Gnr. (actg. Bombr.) S. R., R.G.A.; Merton, 319452 Gnr. (actg. Cpl.) H., R.G.A.; Rawson-Bottom, 562363 Cpl. (A-Mech. S. Sgt.) W. E., R.E.; Rutter, 118488 Cpl. (actg. Sergt.) H. T., R.G.A.; Salmon, 118829 Gnr. G. W., R.G.A.; Smith, 466587 Spr. R., R.E.; Terry, 118696 Cpl. J. J., R.G.A. (now 528643, R.E.); Williams, 104909 Gnr. (actg. Cpl.) T., R.G.A.

## War Office, February 20

The names of the following have been brought to the notice of the Secretary of State for War for valuable services rendered in connection with the anti-aircraft defences of the United Kingdom, and where applicable, an entry will be made in the records of service of officers and other ranks:—

Bedford, Temp. Lieut. H., R.N.V.R.; Bowman, Temp. Capt. (actg. Maj.) E. J. V., R.G.A.; Brown, Lieut. E., R.E. (T.F.); Browning, Lieut. (actg. Maj.) A. Q., R.G.A. (T.F.); Causer, Temp. Lieut. D. S., R.G.A.; Chambers, Lieut. (actg. Capt.) G. K., R.G.A. (S.R.); Davis, Lieut. (actg. Maj.) A. J., R. De ence Corps; Dixon, Lieut. W., R.E. (T.F.); Doody, Lieut. C. W., R.E. (T.F.); Farquharson, Lieut. A. P., Sig. Serv., R.E. (T.F.); Fearon, Temp. Lieut. L., R.N.V.R.; Fenwick, Capt. K. R. G., R.H. Gds.; Feron, Temp. Capt. R., R.G.A.; Ford, Lieut. J. S., R.G.A. (S.R.); Grigsby, Lieut. P. H., R.G.A. (S.R.); Grindling, Lieut. (actg. Capt.) G., R. Defence Corps; Hamilton, Lieut. (actg. Capt.) D. E., R.F.A. (S.R.); Hardy, Lieut. (actg. Maj.) A., R.G.A. (T.F.); Harris, Capt. (actg. Lieut.-Col.) J., R.G.A.; Hedley, Maj. G., R.E. (T.F.); Isherwood, Temp. Lieut. A., R.F.A.; Jones, Lieut. (actg. Capt.) C. H. M., R.G.A. (S.R.); Kennedy, Lieut. (A. Capt.) W. S., R.F.A. (T.F.); King, Lieut. W. S., R.G.A. (S.R.); Kitto, Lieut. J. V., R.G.A. (S.R.); Long, Lieut. R. C., R.G.A. (S.R.).

Maclaren, Capt. (actg. Maj.) M. S., R.F.A. (T.F.); MacWilliam, Lieut. (actg. Capt.) A. R., R.E. (T.F.); Mansfield, Lieut. (actg. Capt.) N., R.E. (T.F.); Mather, Capt. (actg. Maj.) W. H., R.E. (T.F.); Matthews, Lieut. A. K. R.A.; Mills, Lieut.-Comdr. G. E., R.N.V.R.; Mitchell, Lieut. W. L., R.G.A. (S.R.); Mountain, Capt. K. A., A.M.I.E.E., R.E. (T.F.); Orchard, Lieut. (actg. Capt.) E. H., R.G.A. (S.R.); Pollock, Temp. Capt. G. C., R.G.A.; Rankin, Lieut. G. C., R.G.A. (S.R.); Rogers, Temp. Lieut. A. E., R.G.A.; Rowsell, Lieut. (actg. Capt.) T. A. H., R.G.A. (T.F.); Scupham, Lieut. R. W., R.E. (T.F.); Sewell, Lieut. (actg. Capt.) A. P., R.G.A. (S.R.); Smith, Lieut. R. G., R.E. (T.F.); Smith, Lieut. R. M., R.G.A. (S.R.); Swallow, Lieut. T. A., R.G.A. (T.F.); Taylor, Lieut. (actg. Capt.) B. U., R.F.A. (S.R.); Tidd, Temp. Capt. A. G., R.G.A.; Weir, Lieut. C., R.F.A. (S.R.); Winter,

Lieut. (actg. Capt.) J. L., R.E. (T.F.); Woods, Lieut. H. A., R.G.A. (S.R.); Wood-Smith, Lieut. (Temp. Capt.) R. F., R.E. (T.F.).

Alcock, 146593 Gnr. (actg. Cpl.) G. H., R.G.A.; Bailey, 244955 Spr. H. E., R.E.; Barnard, 466150 Spr. (actg. C.Q.M.S.) S. F., R.E.; Bass, 138801 Sgt. J., R.G.A.; Bayliss, 26231 Cpl. (actg. Sgt.) J., R.G.A.; Beavis, 22395 Gnr. (actg. Sgt.) C., R.G.A.; Bedford, 540941 Spr. (actg. Sgt.) H. E., R.E.; Bell, 376684 Gnr. (actg. Sgt.) G. W., R.G.A.; Berry, 562357 Spt. (A-Mech. S. Sgt.) F., R.E.; Best, 465474 Cpl. (actg. C.Q.M.S.) E. L., R.E.; Bills, A.A.2008 Leading Seaman S. G., R.N.V.R.; Black, A.A.1950 P.O. R. G., R.N.V.R.; Bodger, 340490 Sgt. E. W., R.G.A.; Brown, 148494 Cpl. (actg. Sgt.) L. R., R.G.A.; Brown, 135839 Gnr. (actg. Cpl.) T. H., R.G.A.; Buckle, 518306 Sec. Cpl. (A-Mech. S. Sgt.) C., R.E.; Campbell, 104532 Gnr. (actg. Bomdr.) J. G., R.G.A.; Casey, 276912 Sgt. J., R.G.A.; Chamberlain, 275706 Sgt. J., R.G.A.; Channon, S/359599 Pte. (actg. Sgt.) F. T., R.A.S.C.; Clarke, 50293 C.Q.M.S. S., R. Defence Corps; Clarke, 474164 Cpl. W., R.E.; Clifford, 562792 Spr. (actg. Cpl.) C., R.E.; Cole, 95082 Gnr. (actg. Sgt.) J., R.G.A.; Cope, 116844 Gnr. (actg. Sgt.) F. J., R.G.A.; Cound, 58515 Cpl. S., R.G.A.; Cowin, 319447 Cpl. (actg. Sgt.) C. D., R.G.A.; Craig, 86314 Gnr. A. S., R.G.A.; Crawley, 130489 Gnr. (actg. Sgt.) R. G., R.G.A.; Crowhurst, 128610 Bomdr. (actg. Cpl.) A. W., R.G.A.; Culley, 119356 Gnr. (actg. Sgt.) W. C., R.G.A.; Curnock, 124849 Gnr. (actg. Cpl.) A. P., R.G.A.; de l'Hopital, A.A.1545 P.O. R., R.N.V.R.; Dent, 317257 Spr. J. W. K., R.E.; Dowse, 352435 Gnr. (actg. Sgt.) W. F., R.G.A.; Duncombe, 139306 Gnr. (actg. Sgt.) A. D., R.G.A.; Edge, 115003 Gnr. A. E., R.G.A.; Edwards, 90774 Gnr. E. W., R.G.A.; Eves, 472048 Spr. (actg. C.Q.M.S.) T., R.E.; Fitton, 124364 Gnr. (actg. Sergt.) H., R.G.A.; Fitzpatrick, 296295 Gnr. B. J., R.G.A.; Fraser, 562022 Sgt. (actg. C.Q.M.S.) A. R., R.E.; Fryer, 195920 Bomdr. Arty. Clk. (actg. Cpl. Arty. Clk.) H. J. H., R.A.; Godfrey, 122550 Gnr. (actg. Sgt.) G. E., R.G.A.; Gray, 122297 Sgt. (actg. C.Q.M.S.) A. T., R.G.A.; Griffiths, 52691 Sgt. P., R. Defence Corps.

Haines, 19351 Gnr. (actg. Sgt.) J., R.G.A.; Harmsworth, 562498 Spr. (actg. Sgt.) H. G., R.E.; Harmer, 121673 Sgt. E., R.G.A.; Haylock, 113625 Gnr. (actg. Sgt.) W., R.G.A.; Hester, 202113 Sgt. A., R.G.A.; Hill, 518026 Sgt. H. H., R.E.; Hillcoat, 376513 Bomdr. (actg. Sgt.) J. G., R.G.A.; Hodgkinson, 472016 Sgt. (actg. Mech. S. Sergt.) W. T., R.E.; Honner, 563700, Spr. (actg. Sgt.) W. R. E., R.E.; Hutton, 60600 Gnr. (actg. Cpl.) A., R.G.A.; Ireland, 466362 Spr. (A.T./C.) H., R.E.; Isbister, A.A.2873 Able Seaman B., R.N.V.R.; Jones, 88832 Gnr. (actg. Sgt.) A. J., R.G.A.; Killip, 100038 Gnr. (actg. Sgt.) A. E., R.G.A.; Laurensen, 148167 Gnr. (actg. By. Q.M.S.) R. A., R.G.A.; Leonard, A.A.2399 Able Seaman E., R.N.V.R.; Lovett, 139578 Gnr. (actg. Cpl.) W. J., R.G.A.; Martin, 105190 Gnr. (actg. Sgt.) A. J., R.G.A.; Matthews, 128139 Gnr. (actg. Sgt.) J. R., R.G.A.; Medus, 562046 Sgt. (actg. C.Q.M.S.) W. J. J., M.M., R.E.; Mephus, 137414 Gnr. (actg. Sgt.) F., R.G.A.; Moscrip, 157971 Cpl. A. L., R.G.A.; Murray, 434615 Spr. (actg. 2nd Cpl.) J., R.E.; Neale, 135925 Gnr. (actg. Cpl.) T. A., R.G.A.; New, A.A.1978 C.P.O. V. G., R.N.V.R.; Norman, 562409 Spr. (actg. Mech. S. Sgt.) H., R.E.; Patterson, 410600 S. Sgt. D., R.E.; Pawsey, 192508 Gnr. (actg. Cpl.) A., R.G.A.; Peat, 444002 C.Q.M.S. H., R.E.; Pepper, 148612 Sgt. (A. C.Q.M.S.) F., R.G.A.; Quilter, 59958 1st A-Mech. W. W., R.A.F.

Randell, 363022 Mech. S. Sgt. G. W., R.E.; Rayner, 111060 Gnr. (actg. Cpl.) W. F., R.G.A.; Read, 128848 Gnr. (actg. Sgt.) A. J., R.G.A.; Reed, 193182 Sgt. A., R.G.A.; Ridgewell, 110177 Gnr. (actg. Sgt.) G. E., R.G.A.; Ridley, 144452 Gnr. (actg. Cpl.) E. D., R.G.A.; Robinson, 6147 Sgt. (actg. Master Gnr.) C. H., R.G.A.; Robinson, 121910 Gnr. (actg. Sgt.) J., R.G.A.; Rounding, 382275 Gnr. C. M., R.G.A.; Rudd, 277079 Sgt. R., R.G.A.; Rum-bold, 285895 Cpl. G. T., R.G.A.; Shakespeare, 563557 Spr. (actg. 2nd Cpl.) F., R.E.; Shaw, 27435 Gnr. (actg. Sgt.) J., R.G.A.; Simpson, 406226 Spr. (actg. Cpl.) A., R.E.; Smeaton, 278974 C.Q.M.S. G., R.G.A.; Spence, 422619 Spr. (A. C.Q.M.S.) R. C., R.E.; Stewart, 282115 Cpl. (actg. Sgt.) W., R.G.A.; Sullivan, 562339 St. E. H., R.E.; Swinyard, 128519 Sgt. G. E., R.G.A.; Tallent, 122185 Gnr. (actg. Sgt.) J., R.G.A.; Tappley, 562443 Cpl. (actg. Mech. S. Sgt.) F. S., R.E.; Telfer, 173675 Sgt. (actg. By. Q.M.S.) W., R.G.A.; Tervet, 562947 Spr. (actg. Sgt.) W. C., R.E.; Waddington, 92821 Gnr. (actg. Sgt.) G. E., R.G.A.; Walker, 465566 Spr. (A-Mech. S. Sgt.) W. E., R.E.; Ward, 126476 Gnr. (actg. C.Q.M.S.) H. B., R.G.A.; Warner, 20618 Gnr. (actg. Sgt. F., R.G.A.; White, 3071 Sgt. (actg. C.Q.M.S.) A., R.G.A.; Whittington, 138429 Cpl. (actg. Sgt.) E., R.G.A.; Wheeler, 137679 Gnr. (T. Sgt.) H. A., R.G.A.; Willis, Ch.121892 C.P.O. T., R.N.; Woodward, 564331 2nd Cpl. J. W., R.E.

## ROLL OF HONOUR.

Published February 19

### Killed

Cumming, Lieut. C. L. Thomas, Sec. Lieut. P.  
Roberts, Lieut. D. J. Wakeford, Sec. Lieut. F. R. S.  
Simmonds, Sec. Lieut. E. G.

Published February 21

### Killed

Schingham, Lieut. J. E. Waters, Sec. Lieut. A. J.  
Barnes, Lieut. A. Dimmock, Lieut. E. H.  
Baron, Capt. H. H.



## EMPIRE ASPECTS OF AVIATION

IN an address on "Some Empire Aspects of Aviation," delivered before the Australian and New Zealand Luncheon Club on February 20, Maj.-Gen. Sir F. H. Sykes, Controller-General of Civil Aviation, said that while we entered the War with an air service smaller and less well equipped than that possessed by other Powers, we had, with the loyal and devoted assistance of the Dominions, made up the leeway, and could fairly claim that in aviation the British Empire now led the world. Now that the stress of War had passed, an almost equally difficult, and certainly more complicated, period was upon us. We must ensure that the air forces of the Empire were fitted, not only, if need be, for destruction, but were also able quickly to take their place in the great peaceful development of civilisation. One of the principal tasks before us was to open up "all-red" routes and "blaze the trails" for Empire aerial services. The Atlantic had great attractions, but of far greater and more solid importance from every point of view was travel between Cairo and Calcutta, Calcutta and Singapore, Singapore and Australia. Egypt should be made the Clapham Junction of aviation.

The Imperial aspects of commercial air power could not be over-rated, and its foundations must be well and truly laid. The mobility and increasing range of aircraft would alter the relative position of the constituent portions of the Empire, geographical boundaries, buffer States and sea barriers would no longer constitute security. Each Dominion should endeavour to establish a Central School at which flying, navigation, meteorology, and photography should be taught on similar lines. They had been for some time engaged in mapping out the stages of the aerial route to Australia from Cairo via Karachi, Singapore, and the Sunda Islands. Carefully planned pioneer flights along the route as far as Karachi, Delhi and Calcutta had already been made, and experiences of the utmost value had been gained. The question which now arose was where the first "air harbour" in Australia should be. At present they were inclined to believe that this should be in the vicinity of Wyndham, and that Melbourne should be used as a centre from which a route could be established via Tasmania to New Zealand.

The establishment of postal services by aeroplane was quite a practical proposition, and one which the Dominions would no doubt put in hand at an early date. We had, as yet, not much actual experience, but that of the postal service which had now been in operation between Boulogne and Cologne for some weeks—a four hours' flight under good

conditions—was valuable. He hoped it would shortly be linked up with Folkestone, and it should then be possible under favourable circumstances to deliver mails in Cologne within seven hours of their leaving London. A regular time-table was being introduced, stages had been carefully mapped out, and wireless ground stations established. A system of captive balloons was being organised which would be marked according to the locality to guide pilots flying over the clouds. They would also signal the pilots whether it was possible to land under the clouds, and would send ground reports as to the height of clouds and weather, which would be transmitted by the ground wireless stations to the squadron stations. The type of machine so far found most suitable and reliable was a De Havilland, and although no efforts had been made yet to carry maximum weights, it was considered that this type of machine was well able to carry up to 6 cwt. of mail matter.

Australia and New Zealand would no doubt lose no time in building up their own aircraft industries, but it would be essential to have without delay one or two up-to-date and well-equipped aircraft depôts to receive and erect machines and engines which can be obtained as the result of the War from England. The success of commercial flying must depend on the maintenance of reliable and up-to-date meteorological and wireless stations, and the information obtained from those stations must be co-ordinated and organised under State regulations as to the maintenance, mapping, and necessary lighting of all the recognised trade routes.

It must be faced that, particularly in the early stages, aerial transport would be expensive in comparison with other methods, but one must pay for speed. During the ten years before the War an average of over £3,000,000 of gold was exported annually from Australia to the United Kingdom. Business men would be able to estimate the enormous gain it would be if this bullion could be transferred and put into circulation in, say, ten days instead of 60. The same consideration applied between Australia and New Zealand.

When he left Paris a week previously progress had already been made towards the settlement of an International Aerial Convention, the draft articles of which had been under discussion with representatives of the Dominions. When it was approved by the Peace Conference, the organisation of mail and trade routes and services on international lines would become possible, and a comprehensive system of aerial communication should be rapidly established.

## R.A.F. OF OCCUPATION

ALL airmen who have been demobilised (whether they have been transferred to the Reserve or are still on demobilisation leave) and who wish to serve in the Royal Air Force of Occupation under the special bonus conditions authorised for that force, may do so if found suitable.

Any such airman should make application in writing to the Officer Commanding, R.A.F., Reception Depôt, nearest his home, stating clearly his name, official number, substantive rank held in the regular Air Force immediately prior to dispersal, trade, and home address.

In addition, if the airman is on demobilisation leave, he must state the date on which his leave expires. In the latter case it must be understood that unless the airman expresses a wish in his application to rejoin the R.A.F. forthwith, he will not be required to report at the Reception Depôt until after the expiration of his leave.

The following is a list of the R.A.F. Reception Depôts in the United Kingdom, to one or other of which the airman should address his application:—

- No. 1.—40, Upper Brook Street, Mayfair, W.1, London.
- No. 2.—8, Tyndall's Park Road, Clifton, Bristol.
- No. 2 (b).—12, Newport Road, Cardiff.
- No. 3.—Carlton Chambers, Paradise Street, Birmingham.

No. 3 (a).—8, George Street, Nottingham.

No. 3 (b).—12, Abercromby Square, Liverpool.

No. 4 (a).—The Mount, Springfield Mount, Leeds.

No. 4 (b).—10, Sydenham Terrace, North Road, Newcastle-on-Tyne.

No. 5.—9, Somerset Place, Sauchiehall Street, Glasgow.

In the case of air men in Ireland, the application should be addressed to the Officer Commanding No. 3 (b) Reception Depôt, 12, Abercromby Square, Liverpool.

On the receipt of the application the Officer Commanding Reception Depôt will notify the airman whether he is accepted, which will be dependent on his passing a medical examination subsequently at the Reception Depôt, and the date on which he should report, and forward to him at the same time a railway warrant for his journey.

Every airman who is finally approved will be required to sign an agreement to the effect that, on consideration of payment to him of the special bonus authorised under Air Ministry Weekly Order 163 of 1919, he is willing to serve in the R.A.F. of Occupation for a period not exceeding one year after the expiration of the present war or for such less period as his services may be required.

This notice is in supersession of that which was published in the Press on February 4, 1919.

### West Indian Aerial Mail

THE first aerial mail from the West Indies was delivered in London on the afternoon of February 19. On January 28 two American airmen flew from Miami, Florida, to Nassau, New Providence, a distance of 160 miles, which they covered in as many minutes. On January 30 the airmen made the return journey, taking with them a not inconsiderable mail, which was transferred to the rail at Miami and subsequently shipped to London from a neighbouring port.

### An American Passenger Record

CAPT. ROY FRANCIS, who is directing the War Department's plans for a Transatlantic flight, on February 18 flew from Washington to New York. He carried four passengers in a Glenn Martin bomber from the capital to New York, covering the 240 miles in 2 hours and 15 minutes. This is claimed as a record for pilot and four passengers.

The aeroplane will be exhibited at the Aeronautical Exhibition to be held in Madison Square Gardens from March 1 to 15.

# "COMMERCIAL AND PLEASURE FLYING"

By CLAUDE GRAHAME-WHITE

A PAPER under above title was read by Mr. Grahame-White before the Royal Aeronautical Society, at the Central Hall, Westminster, on February 19. The chair was taken at 8 o'clock by Major-General the Right Hon. J. E. B. Seely, C.B., C.M.G., D.S.O., M.P., Under-Secretary of State for the Air Ministry. Pressure on our columns prevents us from publishing the paper in full, but below will be found a *résumé* containing the most important points raised by Mr. Grahame-White.

After a few introductory remarks, the lecturer commenced his paper by pointing out how the British temperament—which has sent the British race adventuring throughout the world for centuries—lends itself admirably to the production of aviators, possessing as it does the two most desirable qualities required of an aviator—courage and caution. What, the lecturer said, we must now contemplate is that the whole of the high-speed transport of the world will be transferred gradually from the land and sea to the air, and we must accustom people to the idea that when they are called on to make an urgent journey, or when they wish to send an important letter or parcel, an air service will be at their disposal.

## The Three Essentials

The lecturer then turned his attention to three questions often asked, namely: Can an air service be made safe? Can it be made reliable? and Can it be made to pay? In view of the accomplishments of aircraft during the War, which had disposed of such old misgivings as to whether or not aircraft would ever be able to fly in bad weather, or whether they would ever be sufficiently reliable to play any really useful part in war, the lecturer thought he was entitled to an open-minded hearing when it came to pointing out the important part aircraft is going to play in developing the commerce of the world.

"The aeroplane," the lecturer said, "is the fastest vehicle in the world, and is likely to remain so. The air is our ideal speedway. But speed alone is not enough. If it cannot be combined with safety, and with an ability to fly regularly to a daily time-table, then the use of the air will be irregular, and air services will be unable to compete with other forms of transport."

Mr. Grahame-White then gave a description of a passenger aeroplane for the London-Paris air service. This machine is shown in Fig. 1. It is to carry, the lecturer said, 24 passengers housed in comfortable compartments, and a crew of five, comprising a pilot, a navigator and directional wireless operator, a motor mechanic, and an attendant in each of the passenger cars. In addition, there will be room for 500 lbs. of express parcels. The engines are to be installed in the central nacelle, where it will be possible to attend them carefully during the journey and to effect minor adjustments *en route*. The two engines placed transversely, will drive, through hollow steel shafting and gearing the tractors on the middle wing, while the third engine will drive a pusher screw placed at the rear of the engine nacelle. Each of the engines is to be of 600 h.p. Fig. 2 shows the engine compartment and the navigation compartment in the front of the car. From here the navigator will have a good view in all directions. Behind the navigator is seated the pilot. In Fig. 3 is shown one of the passengers' cars, seating, it will be seen, 12 passengers, six on each side of a central passage-way. Through portholes in the sides of the car the passengers will have a view to each side, while in the front of the car is a small observation platform giving a good view in all directions.

In Fig. 4 is shown a small machine, designed for high-speed mail carrying. This machine is to have a speed of 170 m.p.h. and will be capable of carrying 100 lbs. of express mail. It should be able to cover the distance between London and Paris in about one and a half hours. Although the load carried might at first sight appear to be very small, the lecturer pointed out that it actually represents 3,200 letters weighing half an ounce each. After pointing out the advantages of such a service, which would enable a business man to dispatch to Paris a letter from his London office in the morning and to receive a reply before the close of a business day, and forecasting a network of such air lines, the lecturer went on to state that the speed of 170 m.p.h. does not represent the limit, and that later on, as experience grows, speeds of 200, 250, and even 300 m.p.h. will be reached. Such high speeds will, the lecturer pointed out, be attained at great altitudes, and the passengers will be accommodated in

totally-enclosed saloons in which the air supply can be made independent of the changes in atmospheric pressures outside. Although disclaiming any great knowledge of large rigid airships, Mr. Grahame-White said he felt that one should recognise that there is now a great future before this type of craft, especially for trans-oceanic flights and on long journeys over undeveloped country.

## Bad Weather

Turning next his attention to the operation of an air service during bad weather, the lecturer said that we would have to organise for bad weather; during fine weather little organisation is required. By bad weather is usually meant a windy day, or a wet day, or one that is both. The lecturer showed that no real trouble need be caused by any of these two forms of bad weather, the wind, unless it be blowing with the velocity of a hurricane, only at the worst prolonging the journey somewhat. On the London-Paris journey, for instance, even a head-wind of 40 m.p.h. velocity, would only extend the journey to four hours as against the seven or eight hours taken by the ordinary means of locomotion. The return journey would help to make up for this by being accomplished at a higher speed than that of the machine in still air.

## Flying in Fog

Coming now to the real weather enemy of flying—fog—the lecturer pointed out that with proper organisation flying in a fog should not present unsurmountable difficulties, the greatest being that of alighting. As for finding one's way, a series of kite balloons moored at suitable intervals along the route, and being above the fog, would provide an excellent guide, and the only really difficult part would be the actual alighting at the aerodrome. Even this, the lecturer pointed out, should be capable of being arranged, by having a series of searchlights around the aerodrome, pointing vertically upwards, and possibly assisted by other searchlights suspended from a kite balloon and pointing downwards. A pilot would then come down gradually until he could see the ring of searchlights, and when low enough would pass between two of the lights and alight somewhere in the middle of the aerodrome. Such an arrangement is indicated in Fig. 6. Actually, with a well-organised airway, one should in some respects be in a better position to combat fogs than is a railway or a ship at sea, which have to grope their way about, while the aeroplane can get above the fog.

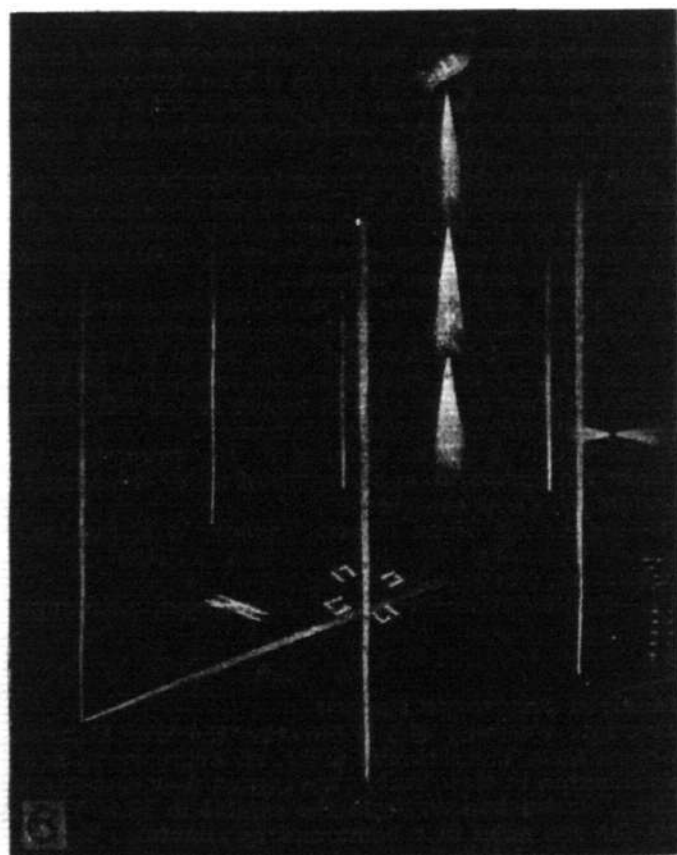
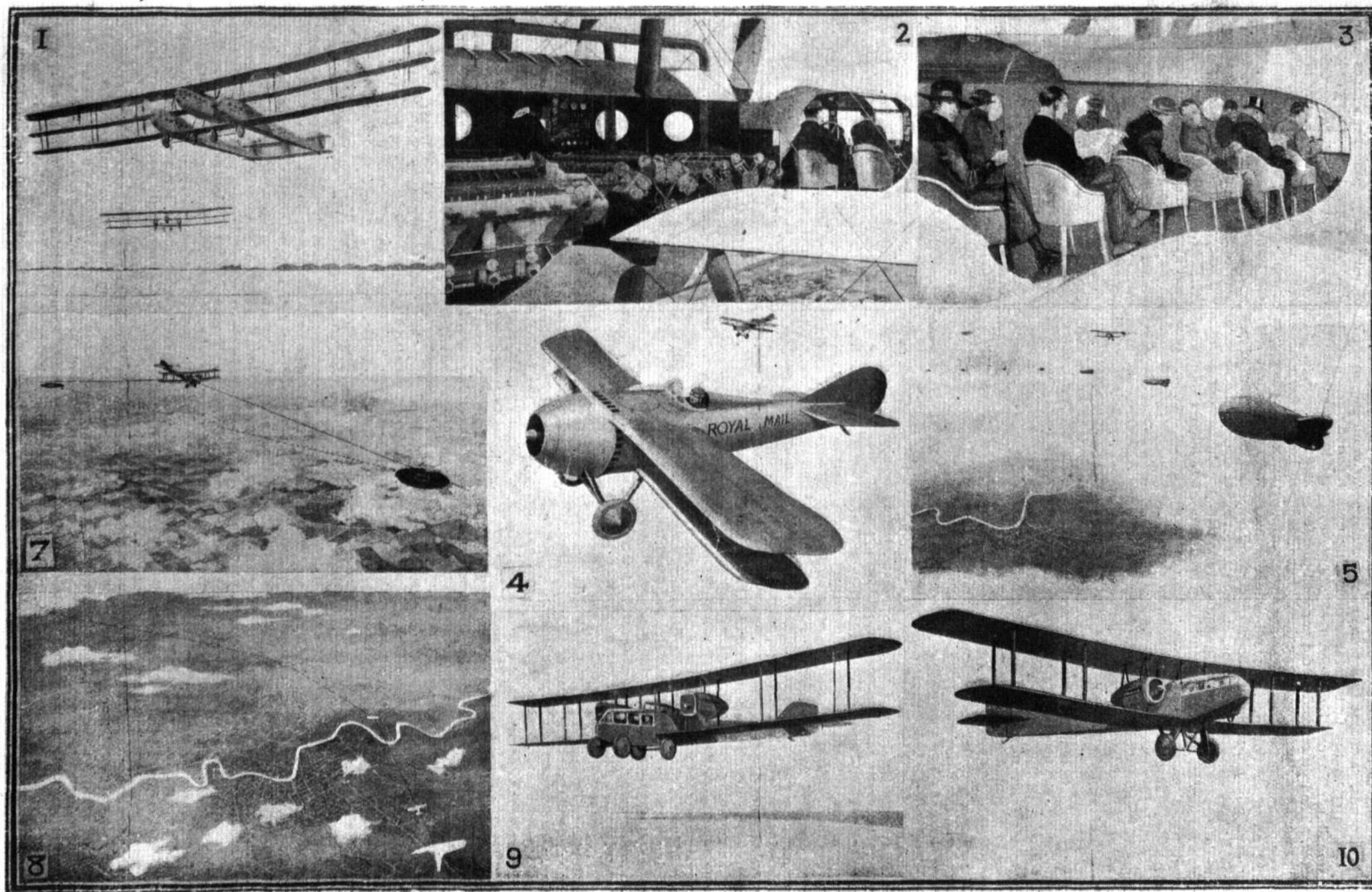


Fig. 6.—This shows arrangement for lighting up aerodromes in foggy weather.





ILLUSTRATIONS FROM MR. GRAHAME-WHITE'S LECTURE.—1. The 24-seater Triplane. 2. Engine room of Triplane. 3. One of passenger cars of Triplane. 4. A fast mail-carrier. 5. Kite balloons marking the way in a fog. 7. Principle of emergency ground system. 8. Panorama of London-Paris airway with landing grounds. 9. A five-seater touring aeroplane. 10. A four-seater touring machine.

## Organisation

The lecturer, coming to the question of organisation, on which so much depends, said that this problem was really quite simple, consisting in the first instance in linking up main and terminal aerodromes by a chain of emergency alighting grounds. The lecturer said he did not wish to infer that aero engines are very prone to break down, but when carrying mails or passengers he thought the argument was a sound one that no precaution or safeguard which would ensure safety and reliability should be neglected. The system advocated was that there should be, on such a route as the London-Paris, emergency landing grounds every ten miles. Fig. 7 shows how in that case, even if engine failure should occur when the machine was half-way between two grounds, the machine, if flown at an altitude of about 5,000 ft., would be able to glide into one or other of the two grounds.

Mr. Grahame-White said that he was not prepared to say that we shall always need landing grounds 10 miles or so apart, and that later on it would probably be possible to do away with the necessity of strictly following definite routes, but that at present it would be advisable, and that the nations of Europe should lose no time in formulating an international rule that on all the main air routes there should be alighting grounds every 10 miles. Fig. 8 indicates such a route between London and Paris, with emergency alighting grounds every 10 miles. As regards the risk of engine failure over the Channel, the lecturer pointed out that a single-engine machine could, by climbing before commencing the crossing, ensure always to be within gliding distance of either shore, while with multi-engine machines the possibility of total engine failure was practically non-existing. Landing grounds should have some easily identified mark of distinction which could be seen from a distance, and it would be advisable to have an international system of identification marks, possibly incorporating numbers, so that a pilot when down at one of the landing grounds might simply telegraph that he was down at ground number so-and-so. The lecturer then drew attention to the value of such alighting grounds as places where touring machines might alight, and which would also serve as repair depôts and garages, where machines could be put up for a longer or shorter period. They would further have the advantage of preventing the necessity of a machine having to make a forced landing on private property, and thus become unpopular with landowners.

The aircraft industry, the lecturer said, desired to start commercial flying with the fewest possible restrictions, but then in turn we must see our responsibilities towards the public, and must do everything possible to carry safely the people who travel by air, and also to prevent the use of the air being a danger or a nuisance to those on the land over which our air routes will pass. A pilot who does not fly considerately, or who endangers the lives of others, must be dealt with firmly, and must have his certificate cancelled or suspended, and it must not be given to him again unless there is a very good reason for so doing.

### State-provided Landing Grounds

In the matter of support by the State, Mr. Grahame-White thought that one way in which the State could greatly assist commercial aviation would be by the provision and maintenance of the emergency landing grounds. By doing this as a Government proposition greater uniformity would be obtained, not only in this country but all over the world, if the various governments decided to work together along these lines. The movement would undoubtedly be greatly assisted in this manner. Take, for instance, the London-Paris line. With 10 miles between grounds one would require 25 grounds, each of about 60 acres, and the rental of which should be about £120 per annum for each ground, or a total of £3,000. It is not suggested that the Government should maintain such a chain of grounds without any revenue accruing. Each transport company would pay annual fees, while tourists who used the grounds would be called upon to pay some specified fee. These grounds would also, of course, be available for R.A.F. machines, and as flying develops they should become a substantial source of revenue.

### Can an Air Service Pay?

Coming now to the question of whether or not an air service can be made to pay, Mr. Grahame-White said he wished to emphasise that with such a new venture as commercial aviation, where there is no previous experience to base one's figures upon, it is difficult to predict financial conditions with any degree of accuracy. He had, however, he said, attempted to steer a reasonable middle course, neither too optimistic nor too pessimistic. The main consideration will be one of depreciation, and here there are no figures available. With present forms of construction the life of an aeroplane is not very long, but as time goes on this will no

doubt be remedied by other forms of construction. In order to be on the safe side, the lecturer had decided at present to write off the total cost of a fleet of passenger machines over a period of only 12 months. As regards uniformity of loads, the lecturer was of the opinion that an air service would be at an advantage, inasmuch as it would be an easy matter to keep a few machines as stand-bys to deal with sudden influxes of passengers or mails, while, on the other hand, when there was a lull in the traffic for any reason it will be a simple matter to use machines of lower capacity. This elasticity inherent to air services should be a great advantage.

The lecturer then showed lantern slides of the costs, etc., of a London-Paris air service. These are printed below:—

Air Service, London and Paris—distance, 250 miles.

Twice daily, each way—1,000 miles a day.

Two return trips per day equals 365,000 miles per annum.

A fleet of six machines, fitted with 1,800 h.p. engines, each machine accommodating 24 passengers, crew of 5, and 500 lbs. of express parcels.

Capital required, £200,000.

Annual profit, after writing off total cost of fleet at the end of the year, £50,000, which equals 25 per cent. on the capital.

	£		£
Capital ..	200,000	Six aeroplanes at £20,000 each	120,000
		Plant and machinery at terminal aerodrome (for maintenance and repairs and shed accommodation)	30,000
		Working capital ..	50,000
	200,000		200,000

### Profit and Loss Account—First Year.

	£		£
Fuel ..	30,000	Income based on three-quarters of "load-capacity"—18 passengers at a fare of £6 5s. od. (4 journeys per day)	164,250
Wages (crew) ..	7,000	375 lbs. express parcels at 5s. per lb. (4 journeys per day)	136,875
Repairs ..	25,000		
Parcels, delivery ..	6,000		
Landing fees, etc. ..	5,000		
Insurance ..	10,000		
Advertising ..	5,000		
Depreciation ..	120,000		
Management ..	23,125		
	251,125		
PROFIT ..	50,000		
	301,125		301,125

The lecturer then went on to say that in his opinion it will be most desirable during the coming spring and summer to make special efforts to foster aerial touring and pleasure flying, and not to rush into these daily commercial air services until an organisation has been prepared and carefully perfected.

By way of demonstrating what is an actual practical feasibility, the lecturer showed a lantern slide of a touring aeroplane. This is shown in Fig. 9, and is a five-seater machine of the twin-engine type. Such a machine would probably cost £5,000 to £6,000, the lecturer thought, and its running cost, everything included, should be about 2s. per mile, or a cost of £30 for the trip from London to Paris. As the machine carries four passengers, this would work out at £7 10s. each, which is not by any means an unreasonable figure. A machine on very similar lines, but having only four seats, is shown in Fig. 10. This machine is intended for the man who flies his own machine, and desires to be able to take three friends up with him.

"In conclusion," the lecturer said, "I should like to strike one note of warning. To prevent aeronautics from being brought into disrepute, to ensure that only those who are well qualified for the task shall be allowed to carry mails and passengers by air in a public service, and to make certain that the craft which carry passengers are not only air-worthy in every respect, but are piloted also by men who are thoroughly proficient, it is obviously necessary that the Government, as represented in this case by the Air Ministry, should exercise a wise control, and should frame and enforce such regulations as will minimise the risk of accident, and help to bring aeronautics safely through the years just ahead of us which are fraught with so many problems and difficulties. Such Government control, exercised with discrimination, I am sure we all welcome, because it will be in the best interests of the great movement we have at heart. But at the same time—and here is my chief note of warning—we must always bear in mind, and guard against, the possible risk that our laws, though they may be excellent and comprehensive, may place us at a disadvantage when we are in competition, as we may be, with countries where the development of flying has been given a freer hand."





# SOME POINTS IN AEROPLANE DESIGN\*

BY F. S. BARNWELL, CAPTAIN, R.A.F.

I STARTED with a very ambitious programme, but soon found that it was quite impossible in the scope of a single paper to deal with more than a few points in the vast subject of aeroplane design. What I have attempted, therefore, in a much chastened spirit, is to work out and analyse a few points which seem worthy of particular attention, and thence to suggest what would appear to be the best practice.

It is probable that what I have done has been done already by most people who have been engaged on designing work for the last few years, and probably done more fully and more accurately. But it has entailed quite a fair amount of work, and the results have been of some interest and value to myself, so I hope that they may prove the same to others.

I shall try to make quite clear the data from which I start, the assumptions I make and the limitations of the conclusions arrived at; so I trust that nothing in this paper should be misleading even if it be more or less incorrect. To those of you who have not done very much the same work for yourselves I hope that it may be of some value, whilst to those of you who have, I hope that it may be of interest as corroborating or contradicting your own conclusions. It is perhaps unnecessary to state that I have not consciously plagiarised, so that anything here given may at any rate be regarded as an independent check.

The first subject touched upon is the aerofoil (Fig. 1, p. 274.) It is a debatable question whether any one form of aerofoil section can be taken as the best for all types of aeroplane. Generally speaking, the thicker the section the lighter will be the main spars for the same strength, but the worse the optimum lift over drag. Moreover, in a thick section the maximum lift value is not much higher than in a thinner one, and the critical angle occurs earlier. Taking it all round, I believe that little is to be gained by using different forms of section, and that it will nearly always prove advantageous to use a so-called "high-speed" form of section and to vary the loading and points of support so as to suit best any particular case.

I show an aerofoil section here which is quite a good standard. I do not wish to infer that it is the best form, but it is not a bad one, and will serve as a starting point. It is, actually, a mean between two sections for which I have experimental data. I have assumed, therefore, that its aerodynamic properties are the means; this is probably rather inaccurate, but I escape the accusation of giving away actual data. I shall allude to it henceforth as "standard section."

The next point to consider is the plan form, which includes the question of aspect ratio and of shape of ends. In any aerofoil structure other than a cantilever, I do not think there is any noticeable advantage in tapering from root to tip. There is a distinct aerodynamic gain in rounding off and fining down the tips, but there is little more to be gained by rounding them off more than as shown in the figure. The form of end shown here is what I think, at present, to be the right type. A tip of this form gives, I think, more efficient aileron control, by which I mean better rolling moment for the same force applied by the pilot, than does the "raking" tip which we have nearly all used for some years past; it is probably as aerodynamically efficient a form as any other of the same length of taper, and it gives front and rear spars of approximately the same length, which is an advantage from the weight for strength point of view.

I shall call this the "standard" wing tip. For purposes of getting out areas, the end of the rectangle of same chord and of same area as the aerofoil is shown in dotted lines;  $\frac{\text{area}}{\text{chord}} + \frac{1}{4} \text{ chord}$  gives us the necessary extreme span for an aerofoil with these standard tips. The span of this rectangle is the "mean" span for the aerofoil, and the aspect ratio of the rectangle the "mean aspect ratio" of the aerofoil.

Now to consider the aerodynamic properties of this aerofoil of "standard" section and with "standard" tips. The family of curves shown here are all for values of lift/drag on a base of "absolute" lift coefficient. Curve A is for an aerofoil of  $5/1$  "mean aspect ratio" and of 3-in. chord, with a relative wind speed of 40 ft. per second. It is actually run from the mean values of wind tunnel figures for two models of rectangular plan form of  $6/1$  aspect ratio, and probably represents facts fairly accurately.

Curve 2 however is a result of rather wild extrapolation and guessing; it purposes to be that for a full-size aerofoil (say, over 3 ft. chord), of same form as the model, at full-size

speeds (say, over 40 m.p.h.). I do not guarantee that it is even approximately accurate, but I think it is so.

Curve (3) is for monoplane form of mean aspect ratio 7. Curves (4), (5) and (6), are for biplane forms of mean aspect ratios 5, 7 and 9 respectively, whilst Curves (7), (8), (9) and (10) are for triplane forms of mean aspect ratios, 5, 7, 9 and 11 respectively. All of Curves (2) to (10), inclusive, are for "full-size" aerofoils of "standard" section, with "standard" tips, at "full-size" speeds. For the biplane and triplane forms the "mean" aspect ratio is that of each aerofoil, of course. In all cases the gap = .8 chord, and there is no stagger.

To obtain these curves I have used figures from model experiments, assuming that relative values are the same for full-size monoplane, biplane and triplane as they are for model. Similarly for increasing aspect ratio, I have taken that the effect is in the same proportion for full-size monoplane, biplane and triplane as it is for model monoplane.

So it is quite probable that these curves are rather far from the truth. I propose, however, now that I have explained their manufacture, to use them later on for comparing different types of full-size aeroplanes.

I have attempted next an investigation into the optimum position for the main spars of an aerofoil. I have assumed the usual practice of two spars only, though there is an interesting field for further investigation as to whether it might not be of advantage to use a greater number. For a very highly loaded aerofoil it might prove economical to employ more than two spars, instead of increasing the number of points of support (Plate II.)

I assume that the spars are solid spruce of one section, and that the section is of the proportions here given. It is doubtful, but again a subject for further investigation, whether there be any other form of cross section more economical than the I, and I do not think that the spindling of an I-section can be made appreciably greater than that shown here without fear of weakness in shear along the neutral lamination.

The maximum depth of spar is governed by the aerofoil section, it is taken hereafter as equal to thickness of section on vertical centre line of spar, minus one-tenth of maximum thickness of section—to allow for thickness of flanges of ribs. I have worked out tables of "spar values," each table being for one position of front spar and for six different positions of rear spar. One sample table is shown here, that in which front spar centre is at .1 of chord length from leading edge, and rear spar centre is taken at .5, .54, .58, .62, .66 and .7 of chord length from leading edge, in turn.

The methods used in getting out these tables are as follows: Centre of pressure taken as at .28 for load on front spar, and as at .6 for load on rear spar; "factor of safety" for rear spar taken as .75 that for front. Calling the depth of spar at .14 chord from L.E. unity, the section value, or "figure of merit," for a spar at any other point is taken as  $(2d^3 - d) + 3$ , where  $d$  is the depth of spar expressed as a fraction of depth of spar at .14. The reason for this value, which is certainly open to criticism, is that for a constant form of spar section the moment of inertia varies as the fourth power of the depth and the sectional area as the square, and I have assumed that normally about two-thirds of the stress applied to the spar is due to bending and one-third to direct compression.

In the left-hand space in the table, then, we have the "figure of merit" for the front spar, at its fixed position for this particular table.

Column 1 gives position of centre of rear spar, column 2 gives depth of rear spar (as fraction of depth of spar at .14 of course), column 3 gives values for square of rear spar depth, column 4 gives values for fourth power of rear spar depth, and column 5 gives "figure of merit" for rear spar. Column 6 gives value for load on front spar when C.P. is at .28, expressed as a fraction of total load on both spars. Column 7 gives load value divided by "figure of merit" value for front spar, and this is called "required moment of inertia value." We now turn to the curves of value for standard I cross section, and find where this "required moment of inertia value," set up vertically to scale, touches the curve of "values for IV." Dropping a vertical line on the base line from this point, we get firstly a reading on the base line for  $b/d$  value required for cross section, which value is set down in column 9; secondly, we measure to scale the value of cross sectional area on the "values for A" curve, which value is put down in column 8 and called "corresponding value on A curve." Column 10 gives a value for front

\* Paper read before the Royal Aeronautical Society, February 26, 1919.



Spar weight, obtained by multiplying this "corresponding value on A curve" by  $d^2$  value for front spar (i.e., .85 for this table), and dividing by an empirical constant .6325.

This empirical constant comes in because I have assumed that with front spar at .14 and the rear spar at .5, the weight of the front spar shall be taken as unity, and its breadth = .5 of its depth. Columns xi. to xv. give similarly obtained values for rear spar, the only difference being, of course, that the spar "figure of merit" is different of each line and is taken from Column v. Column xvi. is the sum of values in columns x. and xv., and is value for weight of both front and rear spars.

I am afraid the methods are not explained particularly clearly, and they are not as accurate as might be desired, but further space cannot be afforded to them.

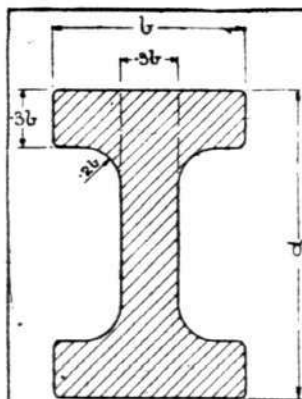
Plate III. Here are given curves for weights of front spar, rear spar, and sum of front and rear spars, on a base of position of rear spar. The values plotted are those found by the methods just outlined.

It is interesting to note some of the points which these curves bring out.

Front spar is throughout lighter than rear, it is nearly as heavy when it is at .06 and when rear spar is at from .66 to .67. Within the limits of the curves front spar is lightest when it is at .12 and rear spar at .42; obviously front spar gets lighter as rear spar moves forwards, and would be zero with rear spar at .28. Rear spar is naturally lightest when front spar is at furthest back position, .16, and when rear spar itself is at about .64. It is interesting to note that rear spar weights increase on either side of some minimum position (from .6 to .64, dependent on front spar position), also that for far forward positions of rear spar this spar is lightest for most forward positions of front spar, whilst for

far back positions of rear spar this spar is lightest for farthest back position of front spar. The latter result is obvious, so is the former of course when we consider that when the rear spar is forward of .6 it is ahead of chosen centre of pressure, so that the nearer the front spar is to it the greater is the down load on the front spar.

The most interesting point, however, is the total weight value. The lightest condition is given as with front spar at .08 and rear at .42, much more forward positions than in any current practice; from the slope of the curves, moreover, it appears that the total spar weight would be still less for a still more forward position of rear spar. But the curves are very flat and bunched together for all cases when rear spar is ahead of .66 and front spar behind .08. Normal practice is about .12 for front spar and .62 for rear, and from these curves we see that the total weight for this disposition is only about 6 per cent. greater than the minimum. We cannot have too far forward a position for the rear spar in practice, or the rib weight will go up, whilst since narrow ailerons are more efficient than wide ones (as we shall come to later on), if the rear spar be far forward we must add to the wing a secondary rear spar, behind the main one, for aileron attachment. It is noteworthy that German practice has inclined to a very much farther forward position of main spars than we usually employ, and to the addition of a secondary rear spar for ailerons. It would be interesting to investigate further for the economic position of main spars, including effect on rib weight and weight of secondary rear spar for aileron. Another matter worth investigating would be the effect on aerodynamic efficiency and strength obtained by a far forward rear spar and ribs more or less flexible behind the rear spar; it is conceivable that the automatic variation of camber due to variation of load on the flexible rear portion

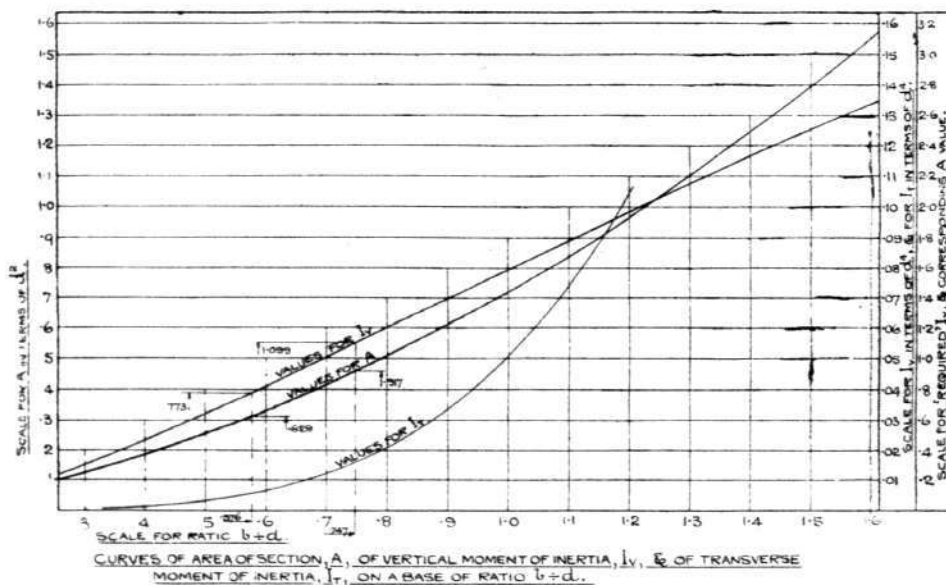


STANDARD CROSS SECTION  
FOR WING SPARS.

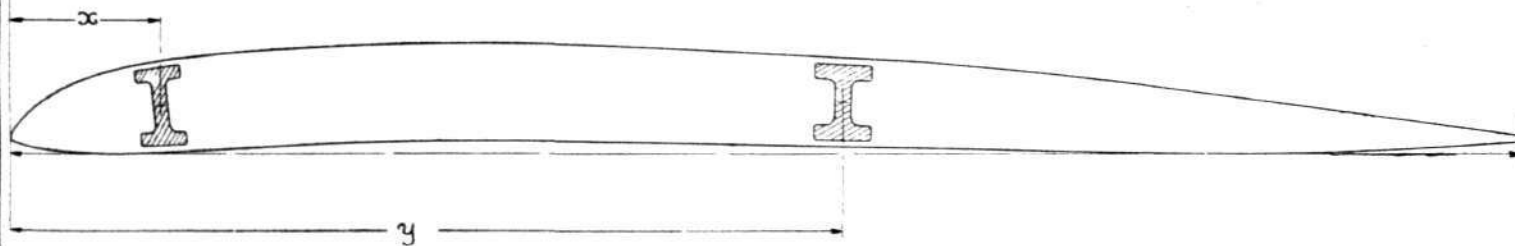
$$A = .3b d^2 + .42b^2$$

$$I_v = .025b d^3 + .105b^2 d^2 - .063b^2 d + .0126b^4$$

$$I_T = .04865b^4 + .00225d b^3$$



CURVES OF AREA OF SECTION, A, OF VERTICAL MOMENT OF INERTIA,  $I_v$ , & OF TRANSVERSE MOMENT OF INERTIA,  $I_T$ , ON A BASE OF RATIO  $b+d$ .



SPAR WEIGHT TABLE FOR FRONT SPAR AT .10, REAR SPAR AT .50, .54, .58, .62, .66 & .70

C.P. TAKEN AS AT .28 FOR FRONT SPAR & AS AT .60 FOR REAR SPAR. FACTOR OF SAFETY FOR REAR SPAR TAKEN AS .75 THAT FOR FRONT.																
(I) REAR SPAR AT $d_R$	(II) $d_R$	(III) $d_R^2$	(IV) $d_R^3$	(V) $\frac{2d_R^3 + d^3}{3}$	(VI) $L_F$	(VII) REQUIRED $I_v$ = (VI) x .765	(VIII) CORRESPONDING VALUE ON A CURVE	(IX) $b/d$	(X) $b/d$	(XI) $L_R$	(XII) REQUIRED $I_v$ = (XI) x .75	(XIII) CORRESPONDING VALUE ON A CURVE	(XIV) $b/d$	(XV) $W_R$ (XIV) x (V)	(XVI) $W_F$ (XIII) x (V)	(XVII) $W_T$ (XVI) + (XV)
.50	.950	.902	.814	.843	.550	719	.588	.547	.784	1.200	1.069	.889	.781	1.268	2.052	
.54	.922	.850	.783	.765	.591	.773	.629	.576	.845	1.120	1.099	.917	.747	1.231	2.076	
.58	.885	.783	.618	.670	.625	.817	.666	.601	.895	1.040	1.164	.983	.781	1.216	2.111	
.62	.845	.714	.510	.578	.654	.855	.698	.621	.938	.962	1.249	1.064	.824	1.200	2.138	
.66	.793	.629	.396	.474	.679	.887	.728	.638	.979	.893	1.415	1.234	.907	1.229	2.208	
.70	.736	.542	.294	.377	.700	.915	.751	.651	1.010	.833	1.658	1.517	1.034	1.300	2.310	

PLATE II

might be of advantage aerodynamically and that the flexibility itself might improve the strength, or more accurately perhaps decrease the danger of failure in the air though not under sand loading.

Plate IV. We now come to the question of the economic position for points of support along the main wing spars. Firstly, we must decide on how the load may be considered to be distributed along the spar. In the top figure is drawn in full lines what is a fair average to take for the grading off of the load at a wing tip. AC represents a length equal to the chord of the aerofoil. In dotted lines is drawn what I call an "equivalent rectangle." The area of this rectangle and the moment of its area about BC are practically the same as are area and moment of area about BC of area below grading curve. The end of the rectangle is .2 of the aerofoil chord short of the spar end. It appears to be sufficiently accurate therefore to consider a spar as uniformly loaded to a distance of .2 of the aerofoil chord length from its end. I use this assumption in the few spar strength calculations which follow in this paper.

The question of economic positions for points of support is a very highly complicated one; it should mean properly

that disposition which will give as a whole the lightest combination of spars, 'tween-wing struts and wire bracing, for some required strength. I have considered only what disposition of supports will give approximately the same maximum stresses in a spar of uniform cross section throughout. There is no reason to claim that this will give the lightest structure, it might prove more economical to use other positions for points of support and stiffen up the stress locally; but it was impossible in the scope of this paper to undertake a very lengthy investigation on this point, and I believe that the uniform section spar disposition is probably about as light as any other.

The five figures below give respectively the positions of points of support for the top and bottom wings of a single bay biplane, for the top wing of a two-bay biplane, for the bottom wing of a two bay biplane, for the top wing of a three-bay biplane and for the bottom wing of a three-bay biplane. At each point of support are given the values of the bending moment and of the vertical re-action, the approximate values of maximum bending moment between points of support are given also.

In the single bay type the disposition is the same for top

**SPAR WEIGHTS FOR 'STANDARD' AEROFOIL SECTION.**

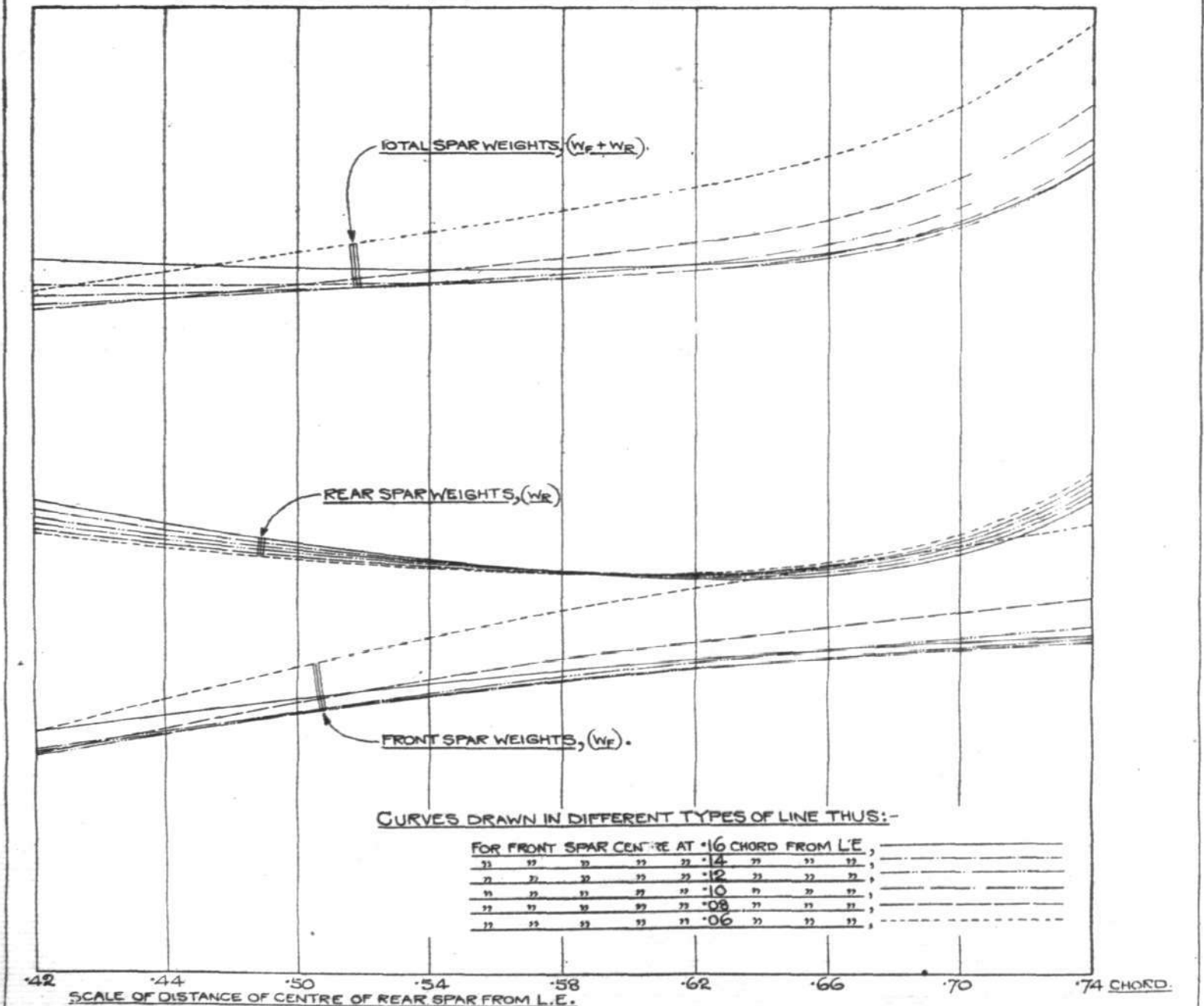
C.P. TAKEN AT .28 FOR FRONT SPAR LOAD, & AT .60 FOR REAR SPAR LOAD.

'FACTOR OF SAFETY' FOR REAR SPAR TAKEN AS .75 THAT FOR FRONT SPAR.

MEAN DEPTH OF SPAR TAKEN AS,  $\left[ \frac{\text{THICKNESS OF SECTION ON SPAR CENTRE}}{\text{MAXIMUM THICKNESS OF SECTION}} \right]$ .

SPARS TAKEN AS OF 'STANDARD' FORM OF CROSS SECTION.

PLATE III





and bottom wings because for the top wing the compression is the same all along the spar inside B. In the two and three bay types the points of support are different for top and bottom wings as the end loads pile up, of course, in the top spars, and there are no end loads (save those due to drift and stagger) in the bottom spars. The points of support for the top wing spars are so arranged that the end loads in a biplane of gap - about .8 chord, and added bending moments due to these end loads, will, when added to the fixing moments, give the same unit compressive stress in the uniform section spar at each point. I have assumed that all spars are pin-jointed at their inner ends, as I consider that to be the soundest practice; "fixed joints" in a composite wood and metal structure are generally questionable, especially when detachability comes in, and one does not know how to consider fairly in calculations a half-hearted type of "fixed" joint.

It is noteworthy that in types of two or more bays the maximum bending moment between any two points of support is never as great as at the points of support. This means that a uniform section spar will be unnecessarily heavy between supports, and it would probably pay to make the spars to strength required, between points of support, and stiffen them up locally for some little distance on each side of supports.

Plate V. We now come to the consideration of the 'tween wing struts. Shown here are the proportions of what I shall call

a "standard strut." The proportions of the cross section are probably about as good from a weight and head resistance point of view as any other. The strut is supposed to be of solid spruce of 32 lbs. per cubic foot density, with an ultimate compressive strength of 5,000 lbs. per square inch, and a value of modulus of elasticity of 1,500,000 lbs. per square inch. The amount of taper has been decided from figures given in the paper by Messrs. Barling and Webb published in the *Aeronautical Journal* of October, 1918.

For convenience in calculations I give for this strut form the values of area, moment of inertia and radius of gyration of cross section in terms of its maximum breadth  $b$ . I give in equation (1) the weight in pounds,  $W$ , of the strut in terms of its length in inches,  $L$ , and its maximum breadth of central cross section in inches,  $b$ , and in equation (2), the value for the crippling load in pounds,  $P$ , in terms of  $L$  and  $b$ .

From equations (1) and (2) is obtained equation (3), which gives directly, for purposes of weight estimates, the value of  $W$  in terms of  $L$  and  $P$ .

In equation (4) is given an approximate value for the head resistance in pounds of the strut in terms of  $V$ ,  $L$  and  $W$ , where  $V$  is the speed in feet per second. The value is obtained from experimental figures given by the N.P.L.

Plate VI. Here are values for weight and head resistance of tension wires. I have assumed that one can always use a wire of exactly the right cross sectional area. The form of

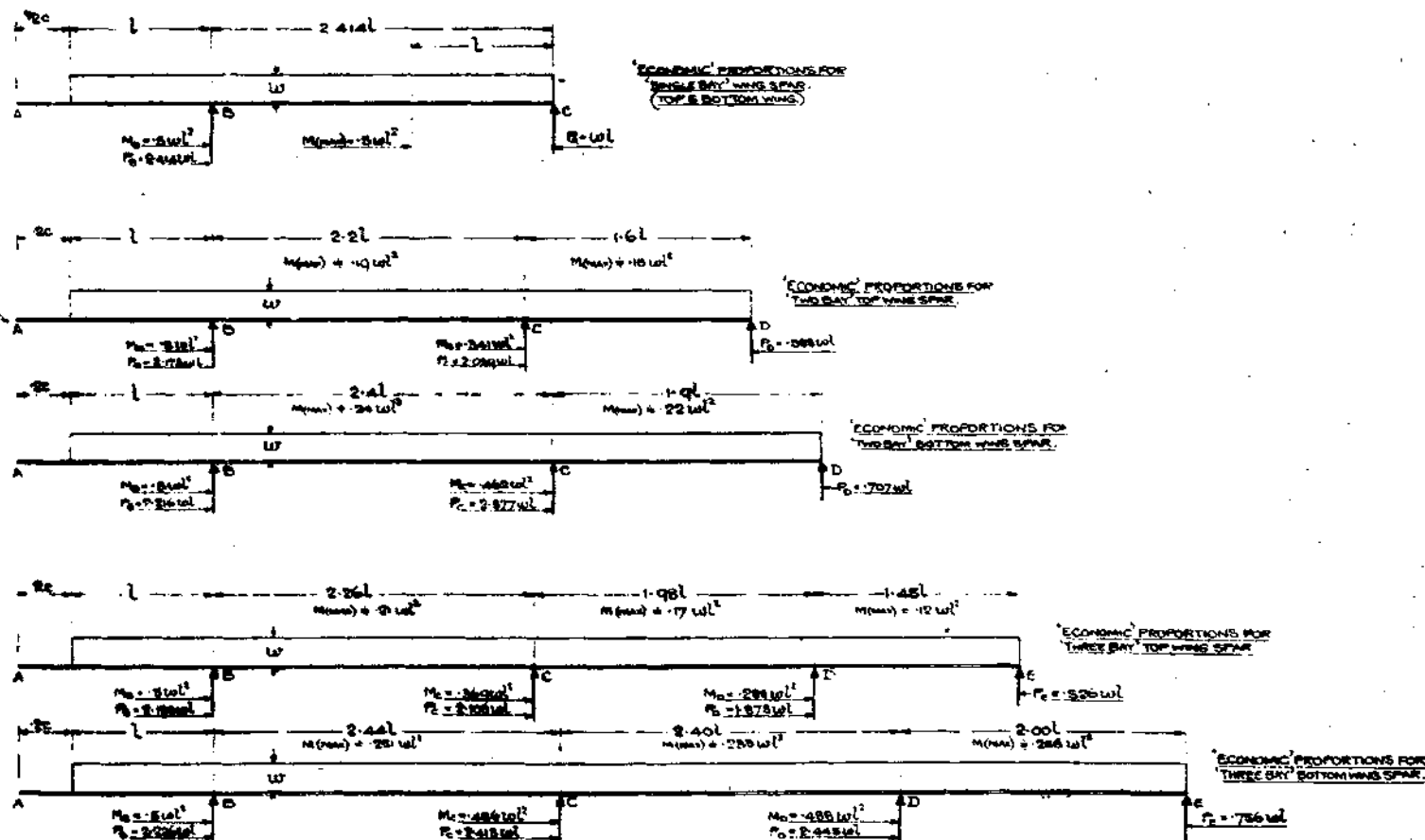
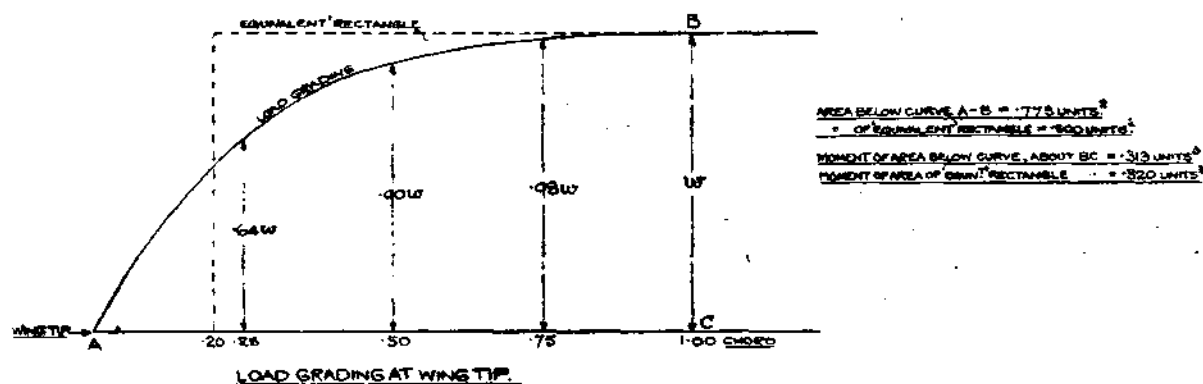
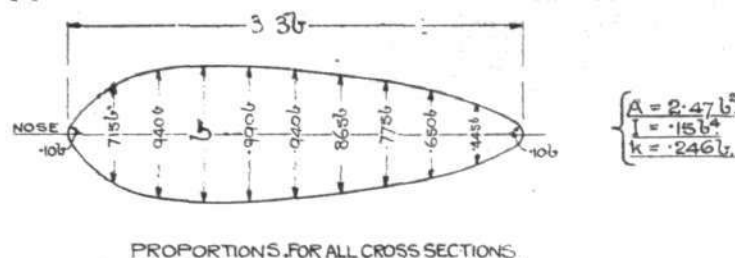
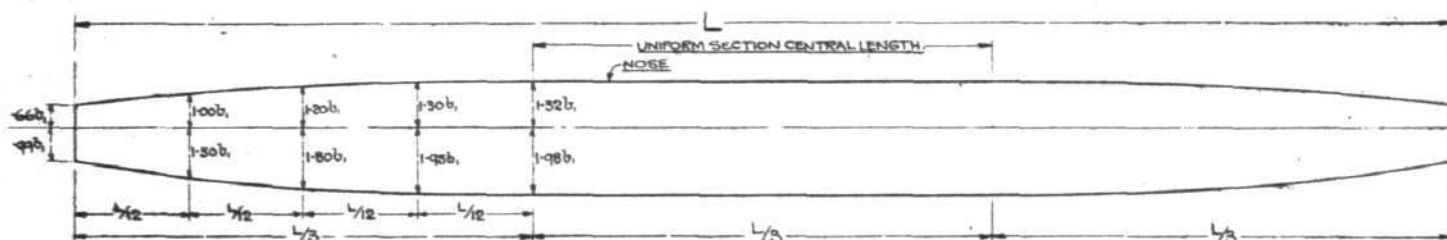


PLATE IV



PROPORTIONS FOR ALL CROSS SECTIONS



PROPORTIONS FOR STANDARD STRUT.

TAKING  $L$  &  $b$  IN INCHES & DENSITY OF WOOD AS  $32 \text{ lbs./cu. in.}$  .....  $W = .0384 L b^2$  IN LBS. (1)

TAKING CRIPPLING LOAD,  $P = .8 \frac{\pi^2 E I}{L^2}$  &  $E = 1.5 \times 10^6 \text{ lbs./sq. in.}$  .....  $P = \frac{1800000 b^4}{L^2}$  IN LBS. (2)

HENCE, FROM (1) & (2) .....  $W = .0000286 L^2 \sqrt{P}$  (3)

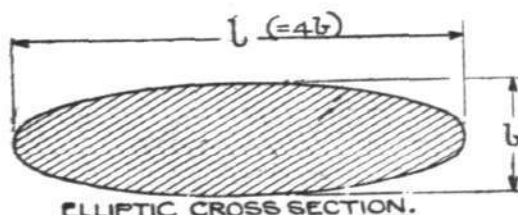
NOTE:— THESE VALUES FOR  $P$  HOLD WHEN  $L/b > 110$ , I.E. WHEN  $L/b > 27$ .

HEAD RESISTANCE AT  $V$  FEET PER SEC.,  
 $R = k_1 V^2 L$   
 $= k_2 V^2 \sqrt{L W}$   
 $= \frac{64}{10} V^2 \sqrt{L W}$  IN LBS. (4)

PLATE V

section is an ellipse with major axis equal to four times minor axis, the density of the material is taken as .284 lb. per cubic inch and the ultimate tensile strength as 45 tons per square inch.

## FIGS. FOR 'RAF' WIRES.



ELLIPTIC CROSS SECTION.

IF  $l$  &  $b$  IN INCHES & DENSITY = .284 LBS./CU. IN. :—

$Q = .7854 l b = 3.1416 b^2$  IN SQ. IN.  
 $W = \text{WGT IN LBS PER FOOT RUN} = 10.7 b^2$  ..... (i)

IF  $P$ , ULTIMATE TENSILE STRENGTH, = 45 TONS/SQ. IN., THEN  
 ULTIMATE BREAKING LOAD  $P = 317000 b^2$  LBS. .... (ii)

FROM (i) & (ii)  $W \div \frac{34}{10^4} P$  ..... (iii)

HEAD RESISTANCE AT  $V$  FEET PER SEC.,

$R = k_1 V^2 L$  WHERE  $L$  = LENGTH OF WIRE IN FEET.  
 $= k_2 V^2 \sqrt{P L}$

FROM N.P.L. FIGS  $k_2 \div 7/10^3$

OR  $R \div \frac{7}{10^3} V^2 \sqrt{P L}$  IN LBS. .... (iv)

$W_e$  = WGT IN LBS OF END FITTINGS (I.E. 2 FORK JOINTS, WITH PINS, SPLIT PINS & LOCK NUTS) =  $\frac{52}{10^4} P$  PER WIRE (v)

PLATE VI

In equation (3) is given the value for  $W$ , the weight per foot run in pounds, in terms of  $P$ , the ultimate breaking load in pounds.

In equation (4) is given the approximate value for  $R$ , the head resistance in pounds of a wire in terms of  $V$ ,  $L$  and  $P$ , where  $V$  is speed in feet per second and  $L$  is length of wire in feet.

The weight per wire, of necessary end fittings, meaning say two fork joints with pins of two lock nuts, may be taken as about  $\frac{52}{10^4} P$  in pounds—this value is obtained from an average of the weights of various different sizes of A.G.S. fork joints, pins and locknuts.

(To be concluded.)

▲ ▲ ▲ ▲

## Proposed Passenger Services

BEXHILL is to have a seaplane passenger service this summer. The Corporation have granted a landing stage on the fore shore to the Gosport Aviation Company.

Nearly every town in the Isle of Wight has received offers from aeroplane and seaplane companies asking for facilities for the purpose of organising flying trips round the island coast as an attraction for visitors during the forthcoming season.

The Bournemouth Aviation Co. proposes to run flying-boat trips to Swanage, Lulworth Cove, Weymouth, Torquay, Isle of Wight, Southsea, Brighton, etc., starting from the beach near Durlley Chine. It is also proposed to use land machines for services from Bournemouth to London and Birmingham.

Portsmouth has been approached by a company with a proposal to construct an aerial station on Southsea Common facing the sea.

A sub-committee of the Folkestone Corporation is now considering offers from the Blackburn Aeroplane and Motor Co. to provide pleasure trips between Folkestone and adjoining towns, and from the Central Aircraft Co. to arrange a regular service between Folkestone and London.

## Folkestone and its Gotha

THE offer of a fully-equipped Gotha as a permanent exhibit is still worrying the Folkestone Town Council. One of the conditions is that it shall be placed under cover, but in view of the difficulties in finding cover the Council asks for permission to place it in the open on the Leas.





# AIRISMS

## FROM THE FOUR WINDS.

REPLACEMENT of the word "aerial" by "Air" in the new "Air" Navigation Bill has distinct merits of its own. It is a convenient precedent and will materially relieve the over use of the former word.

AIR milestones are being passed pretty rapidly. The appointment officially announced of an Air Attaché to the British Embassy at Washington is a very advanced but welcome procedure.

A WRITER in *Berliner Zeitung am Mittag* suggests that the gigantic, and as yet untried 300 ft. span Goliath machine which no Berliner has yet seen and which lies unused in the Döberitz sheds could, with its immense carrying power, be modified for the purpose of the *Daily Mail* Atlantic flight.

AND quite a good idea, but fortunately there is a fly in the Goliath ointment. Huns and all their offspring are barred from entry for the £10,000 Prize.

KING GEORGE, when he, with Prince Albert, attended the R.A.F. memorial service at Westminster Abbey last week, wore for the first time the uniform of General-in-Chief of the R.A.F.

DURING the period of active hostilities, it must have been quite sporty and pleasant crossing between Dover, Folkestone, Boulogne and Calais. According to the Earl of Bessborough, at the recent meeting of the London, Brighton and South Coast Railway Co., the ships when crossing were especially exposed to attacks from the air, particularly in the spring and summer of last year, and some of them had narrow escapes. For example, the *Newhaven* had 34 bombs dropped near to her at one time or another, some from planes flying in relays covering a period of six hours, and the *Dieppe* on one occasion in a Belgian port, and on another at Calais, had bombs dropped within a few feet of her, the latter occurrence causing damage to some of her gear.

FROM Mr. Reginald Bacchus, of Bridge Avenue, Hammer-smith, comes the suggestion for a London memorial of the air-raid battles and the ultimate countering by our defences, of the Hun pirates. Mr. Bacchus' idea is a group in bronze, representing an anti-aircraft gun and team at work, reminding the citizens of no mean city of how the Zeppelins and the Gothas came to "terrorise and destroy," but were not signally successful nor altogether immune from destruction on their side.

NINETY-ONE passengers in armchairs, arranged in rows of four, is the latest aeroplane *de luxe* to materialise up in North London, Capt. W. Bristow, R.A.F., announced the other day. So far we have not heard the exact dimensions of the proscenium opening or the rake of the stage. If light opera fails to attract, we understand a bloated kinema magnate has plans ready to carry on without a break.

WHAT is to be the future of Montrose aerodrome? According to the *Dundee Advertiser*, Mr. J. Leng Sturrock, Member for Montrose Burghs, is parleying with Genl. Seely upon its prospects, and elaborating this a writer in the *D.A.* sets out that he has good authority for stating that, even after Peace is signed, Montrose is to be a centre of aviation activity. On the other hand, the *Glasgow Herald* baldly announces on the same date that official intimation is now made by the Secretary to the Air Ministry that Montrose Aerodrome is to be closed, the reason given for the discontinuance of the work being "that the station will not be required under the post-war organisation of the Royal Air Force."

Both can hardly be right.

A NICE round little sum of 10 millions, there or thereabouts, is not so bad a profit to have secured for the Treasury through

National Aircraft Insurance! This is the net surplus amount now announced as having been paid into the National Exchequer under this scheme. FLIGHT is naturally not unpleased, having regard to the fact that the entire scheme originated in these pages in October, 1914. After hammering away at the idea week after week, the suggestions of FLIGHT were ultimately adopted, lock, stock and barrel, by the Government in July, 1915. Had the scheme been grasped when first set out in FLIGHT, there would have been a good many more millions to swell the present resulting profits instead of these going into the pockets of the ordinary man of insurance. We still hold, as we originally argued, that the whole liability ought to have been a national one, but, failing that, then we claimed that the Government should immediately turn it into a national asset by issuing a national policy—as was ultimately done.

VICKERS, LTD., who are ever far-seeing in their enterprise, are evidently in earnest over aerial matters. Their airship department at Barrow-in-Furness have specially laid themselves out to emphasise the commercial possibilities of lighter-than-air vessels in such measure as to carry conviction to the most sceptical disbeliever in the future of their trans-oceanic airship liners. The preliminary method adopted is the issue of a very remarkable "pamphlet" in duplicated typewriting, with photographically reproduced drawings of the designs and plans of their air liners of the future, the whole being bound in a wrapper, the clever frontispiece design of which we reproduce below in miniature. The publication of this pamphlet is concluded this week in FLIGHT. Such a serious document from such a very serious firm is indeed a welcome harbinger of the practical prospects of the airship liner future.



## TRANS-OCEANIC AIRSHIP LINERS.



THE FIRST RIGID AIRSHIPS FOR SERVICE WITH BRITISH NAVY ENTIRELY DESIGNED & BUILT BY VICKERS LTD.

ALL RIGID AIRSHIPS ARE CONSTRUCTED OF "DURALUMINUM" MADE AT OUR BIRMINGHAM WORKS.

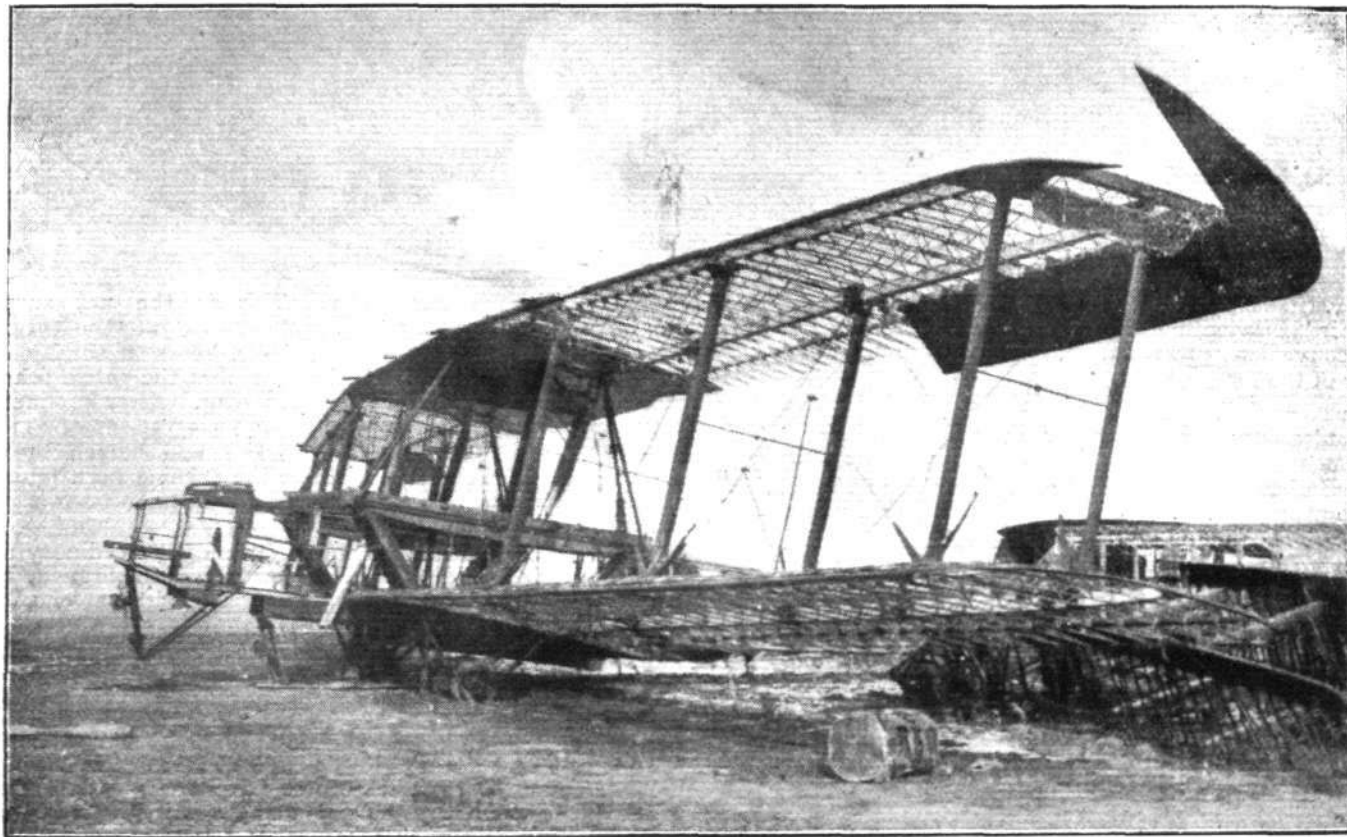
THE ONLY RIGID AIRSHIP DESIGNING STAFF IN GREAT BRITAIN ENGAGED ON DESIGNS FOR AIRSHIP LINERS. CAPABLE OF TRANSPORTING 100 PASSENGERS OR 15 TONS GOODS FOR 5000 MILES AT 75 MILES PER HOUR.



### VICKERS LIMITED.

#### AIRSHIP DEPARTMENT.

#### BARROW-IN-FURNESS.



The skeleton remains on a 5-engined Gotha at Cologne.

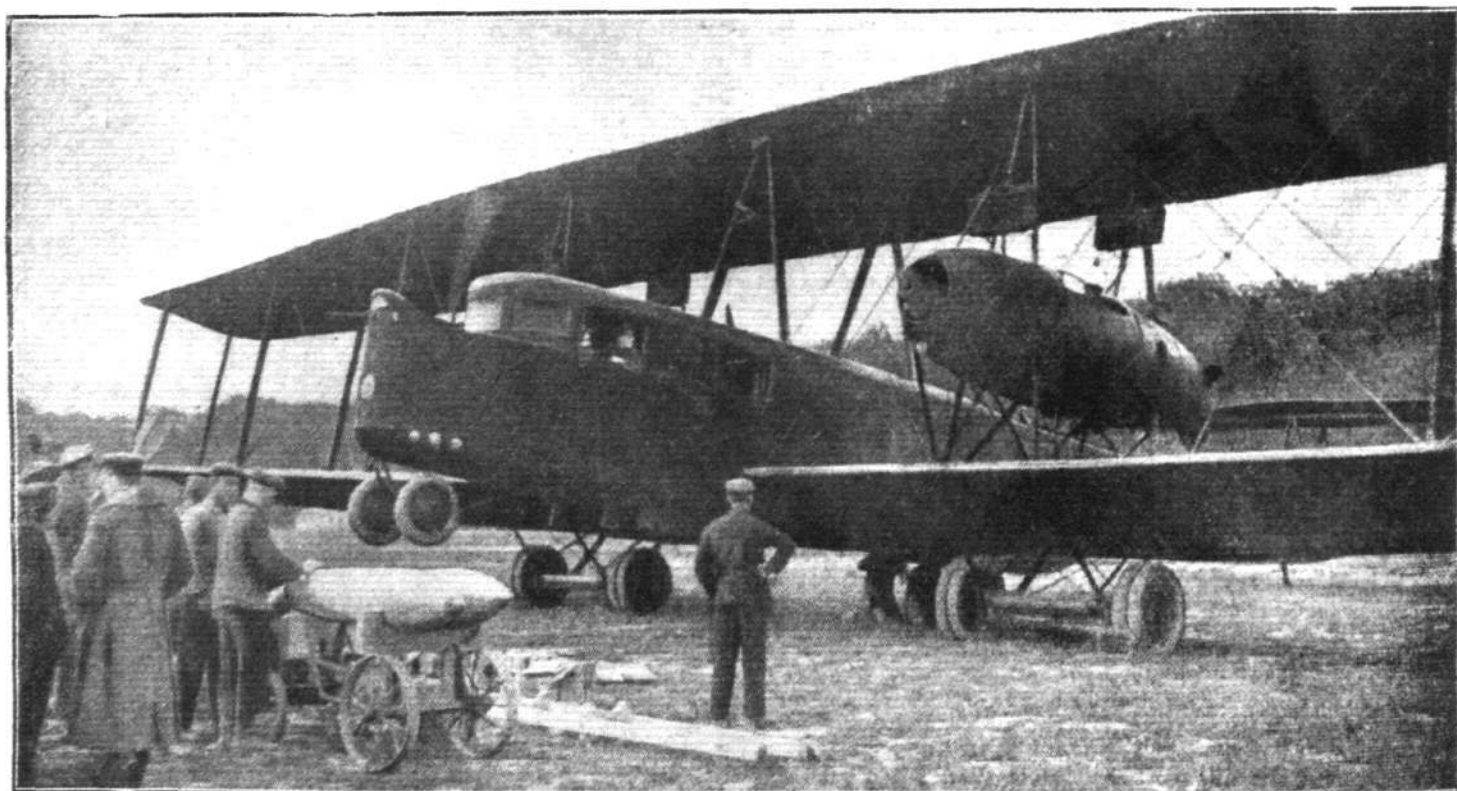
*British Official*

THAT the Germans mean getting not only their foot, but the whole of their body, into the commerce of the world, if the Allies are not very wide awake, is evident on all sides. They are, according to information from Malmo, already making serious attempts to dominate the aeroplane industry and traffic in Scandinavia. Hun financiers, by way of a start, being in negotiation for the acquisition of the Thulin factory at Landsrona, the largest of its kind in Scandinavia. The Swedish papers, scenting the danger, appeal to the Government to take prompt legislative measures to prevent Swedish trade being managed by foreigners.

By way of illustration of another very helpful aid of the aeroplane under otherwise impossible conditions is forthcoming in the latest reports from our troop units on the Murman coasts.

The port of Murmansk, it is pointed out, is free from ice all the year round, and the troops are enabled to receive mails throughout the winter, whereas at Archangel the force is completely cut off for six months from the outside world.

Inter-communication between the two forces, which are under the joint command of Genl. Ironside, is only possible during the winter by aeroplane, and the Flying Corps on the



A GERMAN FOUR-ENGINED GIANT.—The cabin appears to indicate that the machine has been converted into a passenger carrier.



Archangel front has now been supplemented by the sending out of machines and pilots to the Murman force.

"*Courage, mes amis, le diable est mort!*" That the devil is dead indeed is borne in upon us by the sight of the latest issue of "The Barb," the magazine published in Schweidnitz, Schlesien, Germany, by British flying officers who were prisoners of war. Printed in the most Teutonic type, and of a bilious exterior—the format is different to the early number reproduced in "FLIGHT"—it is a gallant and final little effort, for life must be rather drear when:

"Day by day in the same dull way  
Monotonous time creeps on,  
Tear leaf by leaf the calendar's sheaf,  
And you're glad, oh! glad they're gone."

as one of the contributors has put it. How the Gefangenen concerned managed to get the thing printed is a mystery to me, but they did, "and a very good job they made." Somehow or other they got the stuff to press, and wrought with the alien printers until it was "Gepuft." The result is surprising; parodies, full of verve and devilment, in the styles of Phillips Oppenheim and G. K. Chesterton—that wit whom Caesar would have loved. (Let me have me about me that are fat!) There is an excruciating interview with a popular she-novelist of the type that turns herself morally inside out in three volumes; the photographs captioned in the approved manner, "My doggie," "Doing her bit" (the camp female impersonator simpering from under a sunshade). This can't have been one of the worst camps, but you can read between the lines of some of this seemingly light-hearted stuff that most of the men's belts were drawn pretty tightly.

The editor of this little production, Flight-Lieut. J. B. Daniell, of the R.N.A.S., gives some entertaining descriptions of his early flying days across the water. This accepted brother (for he was a pressman) was caught in British Columbia when the biggest "story" in the history of newspaperdom broke on that fateful fourth of August. He "decided to flock to the colours." Miss Katherine Stinson, the American aviatrix, taught him to fly, on a Wright (glacial period). The engine was asthmatical, so they used to infuse a little extra zip into it by pouring ether lavishly into the petrol tank, and then see-sawing the wing-tips to get it to mix thoroughly! This used to crystallise the crank-case, and occasioned a few bursts in the air, but nobody seemed to be perturbed. He finished his four-hundred minute course, and came to England.

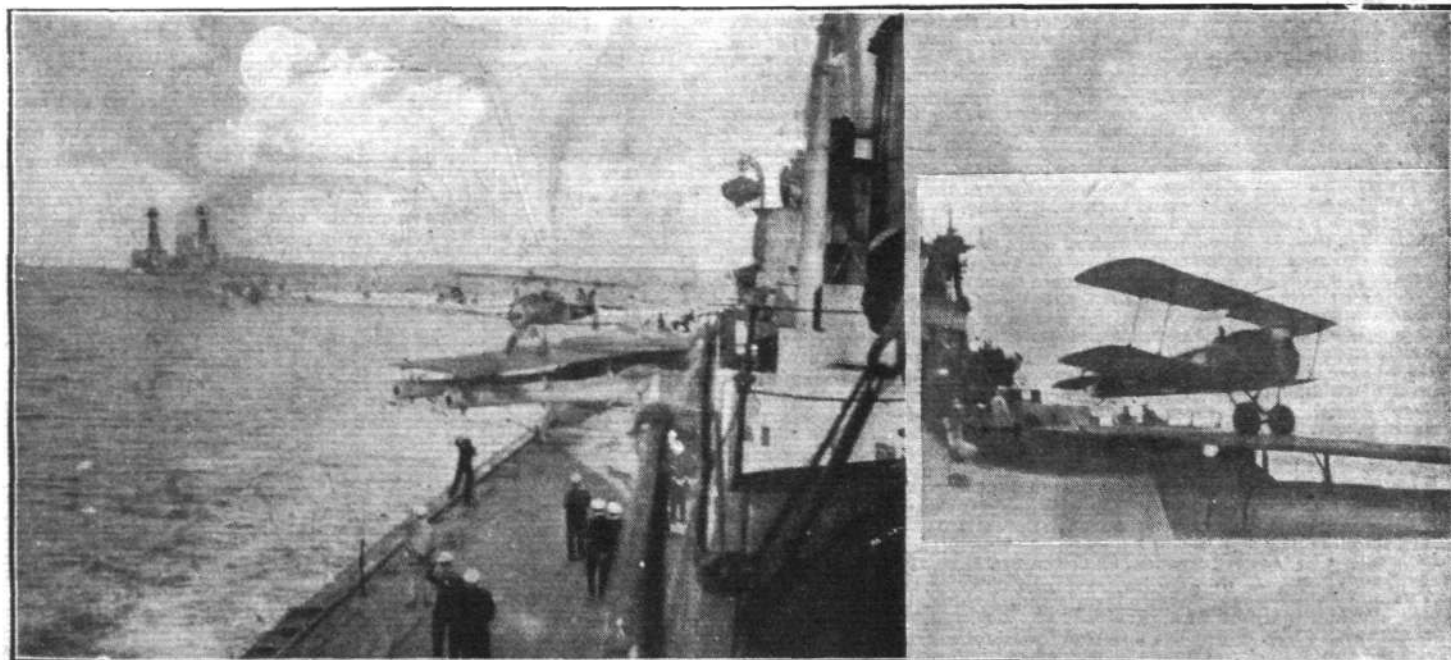
His first flight resulted in such a rich harvest of crashed machines (he accounted for three on landing, owing to a misunderstanding with a short-horn) that they put him to learn all over again. They lectured at him. "What's he raving about?" a Canadian officer asked the narrator in

class. "You can search me, kid!" was the laconic reply. He relates an amusing happening, when a young Flight-Sub. in the dual stage on pushers strolled up in flying kit to look at an advanced type of machine with envy and admiration. The instructor, who had a bad memory for faces, mistook the pupil. "Come on now, jump in," said he. "Make sure of your engine and keep a light hand taking off. Stay up about half-an-hour and become familiar with the feel of her before you land." The dazed quirk looked at him, fascinated, for a few moments, and then articulated thickly, "Why, sir; don't you want it?"

There is a Heath Robinson invention illustrated, a rotary system of hob-nailed boots impinging on a slab of flint, designed to heat the camp, a message from George Robey; an ode to the wounded crow, hurt in a shoot, that dropped into the camp, to find a genial host of foster parents—and doubtless food that could ill be spared; wildly funny parodies of magazine advertisements of the more hustling, American kind; and last—and best of all to our eyes, the simple announcement in the stop-press of the armistice, which came through just as the formes were closing, in which it is said, with all truth no doubt, that "the resources of the English language are inadequate to express our happiness and relief."

We are sure this little production will be a thing that, now they are prisoners no longer, these men will treasure, to remind them of the far-off unhappy time when they were captives beneath alien and unfriendly skies, and made the best of it, like Englishmen.

IN a note to hand from an R.N. officer, dealing with a query in regard to our Sopwith "Milestones," a very lucid description of the handling of seaplanes by our naval units emerges, backed by a couple of photos. to point the moral. Our correspondent writes:—"As regards the Camels (sea type) my ship carried originally one Camel and one 1½-strutter. These were carried on our broadside turrets. The 1½-strutter was used for spotting purposes, and the Camels in the squadron performed formation flying. The method of release is effected by a 'quick release.' When about to fly off, the ship steams at about 30 deg. to the wind and the turret is trained 30 deg., thereby pointing into the wind. The clamps are taken off the ailerons, elevators and rudder, and the quick-release attached. The pilot then starts his engine, and gradually works up to the maximum revolutions. When he waves his hand, the men holding on to the leading edge of the lower plane let go and stand clear, and at another signal, usually dropping a flag, given by the executive officer, the A.M. pulls sharply on the quick-release and thus frees the machine, when the pilot runs along and takes-off the platform. All the time when the engine is running, the quick-release alone holds the machine. A tail guide of about 2 ft. length keeps the tail from dropping at the start. The greatest length of run for taking-off is not more than 30 ft."



A SOPWITH CAMEL, SEA TYPE, TAKING OFF FROM THE DECK OF A BATTLESHIP.—Note the platform carried on the guns and rotatable with them.

# AVIATION IN PARLIAMENT

## R.A.F. Aerodrome

IN the House of Commons of February 17, Capt. Falcon asked the Under Secretary of State to the Air Ministry whether he is aware that the emergency aeroplane landing ground at Freethorpe, in the county of Norfolk, has not been used for any aeronautical or military purposes more than once in the last 18 months; that the land is excellent corn-growing land, and if permission is granted could still be cultivated and a crop grown for the coming harvest; and whether he will at once take steps to have this land handed back to the farmer for the purpose of being put under cultivation?

Major-General Seely: This land was required in connection with the scheme of defence against enemy air raids, and steps have been taken with a view to its immediate restoration for agricultural use.

Brig.-Gen. Colvin asked the Minister of Munitions what the cost of the works of construction at the North Weald Bassett Aerodrome has so far been; whether the contractor has been paid by commission on the total outlay; and what was the percentage he received?

General Seely: The approximate cost of the work has been £75,000. The contractor is remunerated by a commission of 4 per cent. This is based not on the total outlay, but on the prime cost, which excludes, among other items, any general rise of wages subsequent to the date of the contract.

## Air Raids Insurance

MR. ROWLANDS on February 18 asked the Prime Minister whether he is aware that heavy premiums have been paid by manufacturers, traders, and others for insurance against aircraft; and, as the premiums had to be paid for a year, will he consider the advisability of refunding the amount due on each policy as from November 11, 1918?

The Parliamentary Secretary to the Board of Trade (Mr. Bridgeman): The question whether some refund of premium could be given has been carefully considered by the Aircraft Insurance Committee, and they have come to the conclusion that it is not practicable.

Mr. Rowlands: Did the Committee investigate the cases of those firms holding large stocks who have paid large premiums?

Mr. Bridgeman: The matter was very carefully considered.

## R.A.F. Outfit Allowance

COMMANDER N. CRAIG asked the Under-Secretary of State to the Air Ministry whether at the time of the signing of the Armistice a number of cadets in the R.A.F., having passed all their examinations, were in process of qualifying for commission by putting in the requisite number of hours flying; whether he is aware that, in accordance with a practice recognised in the Army as well as in the R.A.F., and in view of the difficulties of obtaining uniform in the period elapsing between the granting of a commission and the time for reporting for duty, many cadets placed orders for uniform with Service tailors and passed in payment orders on Service bankers; whether

the granting of commissions has since the signing of the Armistice been stopped or very largely reduced; whether he is aware that these circumstances have occasioned hardship both upon cadets and suppliers; and whether he will take steps to assist these cadets in discharging obligations to suppliers, incurred upon a reasonable and legitimate anticipation of becoming commissioned officers?

General Seely: All flight cadets who qualified for commissions before the date of the Armistice have been granted commissions, carrying the right to the full outfit allowance of officers. The question of granting a special outfit allowance to flight cadets who qualified for commissions after the Armistice, but have not been granted commissions, is now under consideration, and an announcement on the subject will be made shortly.

## R.A.F. Officers

MR. JOYNSON-HICKS asked the Under-Secretary of State to the Air Ministry if he will state how many officers there were in the R.A.F. on November 11, 1918; how many have resigned; and how many have been compulsorily demobilised?

General Seely: The total number of officers in the R.A.F. on November 11, 1918, was 30,122; since that date 382 have resigned, and, in addition, 3,359 have been demobilised.

## R.A.F. War Pay

MR. FORESTIER-WALKER asked the Under-Secretary of State to the Air Ministry whether he is aware that the 1d. per day war pay is not applicable to the R.A.F.; and whether he is prepared to put the members of the R.A.F. on the same basis as they would have been had they still been in the R.F.C. as regards pay and war pay?

General Seely: War pay is not granted to members of the R.A.F. with certain exceptions, for the reason that the rates of pay were fixed on an inclusive basis. Members of the R.A.F. who were transferred from the R.F.C. were allowed, on transfer, either the R.F.C. rate of pay (plus war pay) or the R.A.F. rate (excluding war pay), whichever was the more beneficial.

## Air Raids (Damage to Public Works)

MR. CROOKS asked the Lord Privy Seal whether he is aware that local authorities have made application to the Treasury for reimbursement of expenses incurred in repairing damage to public works and sewers by hostile aircraft; that the Treasury have refused to accede to this demand; and whether, in view of the fact that this damage was a matter of national concern, he will have the question reconsidered?

Mr. Bonar Law: I cannot add anything to the answer which I gave on November 6 last, when I stated that the subject had again been considered by the Government, and that we did not think it would be right to transfer this expenditure from the local authorities to the Treasury.

## THE AIR NAVIGATION BILL

THE Bill came up for third reading in the House of Commons on February 21.

The Under-Secretary of State for Air (Major-General Seely): I beg to move, in Sub-section (1), to leave out the word "aerial" ("regulate aerial navigation"), and to insert instead thereof the word "air."

I have accepted the proposal of an hon. friend of mine which, I hope, will be accepted by the House that instead of the word "aerial" we should use the word "air" throughout. It is simpler and easier to say.

Amendment agreed to.

Lieut.-Col. Malone: I beg to move, at the end of Sub-section (1, a), to insert the words

"for the conveyance of passengers, goods, or mail, for hire or reward."

It will be seen from this and subsequent amendments that they class themselves generally under matters relating to personnel and material, and that generally speaking they aim at lightening the very stringent restrictions which this Bill introduces. In moving this amendment, I would like the right hon. and gallant gentleman to give some indication of the basic principles which are at the back of his mind in putting forward this Bill. The issue of the amendment is the restriction of individual right in experiments in flying. We think the restriction of individuals in experimenting and carrying out private trials of their own if they are limited to Act of Parliament will severely handicap enterprise and individual effort. When this Bill comes into force it will mean a lot to aerial commerce. I do ask my right hon. friend, in its initial stages, to give the very greatest scope he can to individual enterprise and energy.

Major-General Seely: While I do not wish to accept this and the consequential amendments, for reasons which I will presently give, I am entirely at one with my hon. and gallant friend and his second. I agree with most of those who are specially interested in aviation in thinking that we ought to give the fullest possible latitude to experiment and of freeing it completely from State inspection and control. The reason we do not accept these amendments is that we might defeat our own object. The actual words would limit inspection by the State to those who carry goods, passengers, or mails—it might be presumed for hire, as stated in this and other amendments. It would be possible—I do not say it is probable—that some company or some eccentric person could evade the Regulation by not charging for their flights, and by incurring severe accidents by people with unsuitable types of machines retard the progress of aviation to a very great degree. I would suggest, if I may, to my hon. and gallant friend that if I give him my assurance, as the responsible Minister in charge of this Bill, that we have no intention of using this power for the inspection or registration of experimental craft or other craft built by those who are interested in aviation, and who intend to use them for their own experiments in their own flying, that we need not pass these amendments, or agree to amendments suggested later, with this added safeguard that, as he knows this is only an interim Bill and that a bigger Bill will come on later. In the meantime, on my personal assurance as a Minister responsible, I may repeat that we have no intention whatever of inspecting either the men or the pilots who are building machines for experimental purposes and for their own private flying. I hope the hon. and gallant gentleman will accept this assurance, as it will enable us to agree to the deletion of the proposed amendments with a view to their consideration in the proper wording of the bigger Bill later.

Lieut.-Col. Malone: In view of the definite pledges given by the right hon. and gallant gentleman, I beg leave to withdraw my amendment.

Amendment, by leave, withdrawn.

Lieut.-Col. Malone: I beg to move, in Sub-section (1, b), after the word "registration" ["the registration, identification, inspection"], to insert the word "and."

This and two subsequent amendments can, I think, be taken together. These amendments deal with personnel and material. I simply want to remind the right hon. gentleman of the conditions which existed in the country under the two systems. Under the War Office system the development of aircraft was very much restricted. I think it can be generally accepted that the system adopted by the Admiralty allowed us, at the beginning of the War, to have a complete predominance of the air. There is one other point on which I should like him to inform us in connection with this amendment.

Major-General Sykes is to be Controller-General of Civil Aviation. What does that mean? The term "aviation" generally includes only heavier-than-air craft.

Major-General Seely: It may be convenient if I answer the questions put to me now. I am asked whether the Controller-General of Aviation (Major-General Sykes) will be concerned with lighter-than-air as well as heavier-than-air craft. The answer is "Most certainly." For the moment, as the hon. and gallant gentleman knows, the Admiralty are principally concerned in the construction of lighter-than-air craft. However that may be, the Controller-General of Civil Aviation will be charged with the mapping out of air routes, with securing landing grounds, the supervision of Rules and Regulations for air travel, with the arrangements being made to link up this country, not only with the Continent, but with our Overseas Dominions and so on. All these vast possibilities involving heavier-than, as well as lighter-than, air machines, will come under the purview of the Controller-General. I see it is stated in *The Times* to-day that the sea may be regarded as a hostile element. Though I agree with much that is stated in the article, I do not think that is so. A calm sea is a favourable element. In any event, if you include lighter-than-air machines in the things under the purview of the Controller-General of Aviation, the sea is peculiarly favourable for many purposes. For these reasons, I hope the hon. and gallant gentleman will be satisfied generally, that the whole of aerial navigation, or as we shall now say, "Air" navigation will come under the purview of the Air Ministry, and especially of the Controller-General of Aviation, including the heavier and lighter-than-air craft.

Amendment, by leave, withdrawn.

Major-General Seely: I beg to move, at the end of Sub-section (1, c), to add the words,

"especially those used for carrying passengers, goods, or mails."

Amendment agreed to.

Lieut.-Col. Moore-Brabazon: I beg to move, at the end of Sub-section (1, b), to insert the words,

"but no such inspection or certificate shall be refused on the ground that plans were not submitted to the Secretary of State prior to the completion of the aircraft."

The right hon. gentleman has been so frank with us that I want to state why I put this amendment down on the Paper. It has been said that some protection is wanted for the public, and that inspection by the Government is a necessity. The hon. Baronet took the view that he thought this proposal was not necessary, but we think it is necessary. This measure, which looks a very innocent one, gives power to inspect aircraft for public service, but there is a possibility that the Government is going to control the design of all aircraft in this country. I think that must lead to absolute stagnation in a new industry like aircraft industry. We must allow private firms to have some initiative in design, but before any firm can do aircraft of any sort they have to go to the Government and lay before them their design before they can start. I think that provision will hamper enormously the initiative of those firms. We must remember that private firms have often been competitors before and are to-day in aviation. As we look back we see that the private firm has almost invariably been the Government in design and in turning out successful aircraft. If my proposal is carried it will be more difficult for the Government to squash a radically new departure if the machine is brought complete for trial, and when that is done all the Government can do is to look at the machine from the point of view of performance, and they will be able to see whether it does give the performances and results claimed for it, and whether it does the work asked of it. I must remind the House that there are fashions in aeronautics just as in anything else. We have had a fashion for the biplane and for the monoplane and we have had different kinds of engines. If you are going to allow the whole design in aircraft to be centred in the Controller-General, I think it will be a dangerous thing, because that assumes that that man must necessarily be the best, and in a new subject like this we cannot allow the whole design to rest in the hands of one man. On that point the Under-Secretary of State for Air must appreciate that with a load on their necks like this no firm is going to start the exploitation of aviation in order to hand over their ideas in regard to new machines to the Government. That is not a scheme which will promote the success of this great subject.

There is another point of view which I want to bring before the Under-



Secretary. On the Second Reading I said that this Bill was a blank cheque on aviation. The Under-Secretary for Air put before us his proposed Orders in Council, and some of those, I am glad to say, have been altered, but there is still this objectionable part. The Controller-General of Civil Aeronautics, who has now passed from a soldier to the wearer of the bowler hat, said the Government intended to standardise design as much as possible. If we were dealing with ships it would never be tolerated for one minute that all ships were to be of the same design, and in a subject wrapped up with so many new possibilities it would be preposterous to impose standardisation of design. I cannot help asking what is really at the bottom of this proposal. I believe there is at the back of the Air Ministry an idea that no machine shall be built in this country unless it has the potential possibility of being turned into a war machine straight away. If the Government by means of this simple Bill have that in mind, I wish to protest here on the floor of the House. If the Government want aircraft built so that they can turn them into war machines at a moment's notice, then let the Government say so, and let them subsidise them, but do not let such a thing be introduced under cover of this Bill. The Secretary of State for Air told us the other day that the designs for war and for commercial aircraft are taking very separate lines. If the Government are going to compel machines to be useful for war, then they are going to sacrifice their usefulness for commercial work. The two things go entirely separate ways, and it is going to be very difficult to keep them together. I do hope that the Under-Secretary will accept this amendment, because the trade will feel very much freer in action if they can bring their machines complete for inspection and the Government can only look upon them from the point of view of whether they can do the work that is asked of them, and not whether they are machines that can be turned to use in war at a minute's notice.

Major Oscar Guest: I am convinced that five years from now aeroplanes will play a very large part in the transport of mails and goods throughout the world, and it seems to me a question whether this country is going to reap the benefit of that expansion and is going to win in the race of invention and progress. My feeling is that if this amendment is favourably considered, it will encourage and help aeroplane invention and new ideas.

Major-General Seely: It is not often that anyone on this bench listens to two speeches proposing an amendment with which he is so entirely in accord, I say at once that I am in accord with every word that fell from my hon. and gallant friend who moved the amendment (Colonel Brabazon), and, if possible, even more, with remarks that fell from the hon. and gallant gentleman (Major O. Guest). My only doubt is as to the best way of achieving the result which we all have at heart. I suggest, instead of putting it into the Bill, which is a somewhat unusual procedure, that I undertake to make it perfectly clear in the Regulations. I will define what we will make clear in the Regulations. It is, perhaps, a little more drastic and complete than is proposed in this amendment. I will deal with two points raised and explain how completely I myself, the Secretary of State, and the Air Council, are in accord with their views. They say, first of all, "We do not want any Government Department to keep on interfering with designs." I entirely agree. That is not the intention of the Air Ministry, and the Regulations will make it quite clear that is exactly what they are not to do. When I remind the House that I told them in a previous Debate that I myself struck out the word "suitable" in order to leave nothing but "safely" in the Regulations which provided for inspection, I think they will understand how completely that is the view of the Air Minister. Our duty is to see that aircraft are reasonably safe. It does not matter what they are like. They may be air ships or tractors, motor planes or monoplanes; they may be of a design of a most fantastic character, but, unless it is proposed to carry people for hire, and they are bound to break the neck of the passenger, it is not our business to interfere. We act solely on the lines on which the State acts with regard to ships. If a ship is reasonably seaworthy, then whatever its design it is certified.

The next point, which is a very important one and a point of real substance, was whether the State would be tempted to endeavour to secure uniformity or standardisation of design in this new science in order to have the advantage of having aircraft readily available for use in time of war. Here, I think, there might possibly be a divergence of view, but I say unhesitatingly that the State must not and shall not, while we have anything to do with the direction of policy, adopt so fatal an error. In my judgment, as an humble student of air matters, the divergence which we now see beginning between civilian and war types is going to be on an ever-increasing scale. I am quite sure that within a very few years the type of machine which is flown for civilian transport, in which in common with those hon. members to whom I am speaking I see a very great future, will have diverged in a far greater degree from the fighting machine than even the merchant ship—the fast liner—has diverged from the battle-cruiser. What you want in a fighting machine is extreme speed, and climbing and manoeuvring power. They are points which may be of advantage incidentally in a commercial machine, but obviously they are not of the first importance compared with other factors which are demanded for commercial or other civilian travel. For these reasons I can assure the hon. and gallant gentleman who seconded the amendment that we have no intention whatever of trying to interfere with designs just because Government Departments do interfere, and will undertake to put in special words to make it quite clear that that is our intention. In the second place, still less have we the intention to try and make our Air Force a little cheaper by compelling civilians to build their machines to our design. I hope that will satisfy my hon. and gallant friend, especially when I say that I have had long consultations with the Society of British Aircraft Manufacturers which have been continued between the Controller of Supply and the Secretary of the Air Ministry, and, as far as I know, they themselves are completely satisfied that the Regulations make our intentions plain; but if they do not, I will see that words are put in to make it clear that we will not interfere with design except in so far as it is necessary to give public safety to air travelling.

Capt. Benn: We expect there will be changes of personnel in the Air Ministry. I hope there will be a big change in the direction of restoring to the Ministry its independence and take it away from the control of the War Office. It would be much more satisfactory from the point of view of aerial navigation that what we desire should be put into the Bill, and not depend upon the will of the Air Minister of the day. Moreover, the Bill is only a temporary measure, so there can be no real objection to making assurance doubly sure by inserting these words in the Act itself. For the people who are going to make experiments it is necessary that they should have the assurance and the knowledge that nothing will be done which would interfere with the success of their undertaking. That assurance would be much better given by an Act of Parliament than by relying on Orders in Council made by the Air Minister and laid on the Table of this House which it might be inconvenient to discuss.

Major-General Seely: I can only say a word in answer by leave of the House. There is really an obvious objection to putting these words in the Act. Suppose I were to promise to give to my hon. and gallant friend who has just spoken, to the mover and seconder and all those interested a copy of the Regulations embodying the substance of what they suggest. I am making Regulations to secure that any design, however fantastic, provided it safeguards reasonable public safety shall not be interfered with. I think that is far better than introducing words into the Bill. Regulations have not yet been agreed to, but they will have to be laid upon the Table of the House.

I will undertake to put words to the effect indicated in the larger Bill later on. Anyone who has had charge of a Bill knows that whenever an amend-

ment of this kind is put in at the last moment without consideration it may lead to all sorts of difficulties and you may defeat your object by using exact words.

Capt. Benn: When will that be?

Major-General Seely: Directly we have got the adhesion of the foreign countries to the convention which I expect to get shortly.

Amendment, by leave, withdrawn.

Major-General Seely: I beg to move, in Sub-section (1, e), to leave out the words,

"imported and exported and passengers transported in aircraft into or from the British Islands, or from one of the British Islands to another," and to insert instead thereof the words,

"conveyed in aircraft into or from the British Islands or from one of the British Islands to another."

This amendment is a purely verbal one, as suggested by the Parliamentary draftsman.

Amendment agreed to.

Commander Bellairs: I beg to move to leave out Sub-section (3).

My object in moving this amendment is somewhat disarmed by the assurance which has just been given that there will be a larger Bill this Session. My objection was to the very drastic powers in this Bill. We have got accustomed to drastic powers in war-time, but this is a peace Bill; if my right hon. and gallant friend is prepared after this Bill has gone through to give us an assurance that the Orders in Council he proposes before they come into operation will be submitted to a Committee of Members—say, of Members nominated by the Air Committee—for discussion, not for decision, that would satisfy my point.

Major-General Seely: I gladly give the assurance asked for by my hon. and gallant friend that, before making an Order in Council and laying the Regulation on the Table of this House, they shall be circulated to those specially interested—for instance, the Aerial Committee of Members. I have given the same assurance in regard to Regulations to be made under this Bill. I am sure that is a good plan, and I will see that it is followed up. I wish to safeguard this, however, by saying that when the House is not sitting, or in the case of urgency, it may not be possible to do this. I do not see how such a case could arise, but it might be that something occurred involving the necessity for the Government issuing an Order in Council in the interests of public safety or of health, and, in such a case, I will give such notice as is possible. I will see that the hon. Members interested are the first to receive an advance copy of any Regulations we propose to make that will become the subject of an Order in Council.

Amendment, by leave, withdrawn.

#### CLAUSE 2.—(Extension of Purposes of Air Council.)

The purposes of the Air Council shall include all matters connected with aerial navigation.

Amendment made: Leave out the word "aerial," and insert instead thereof the word "air."—[Major-General Seely.]

#### CLAUSE 3.—(Short Title and Duration.)

(1) This Act may be cited as the Aerial Navigation Act, 1919.  
(2) This Act shall continue in force until the first day of January, nineteen hundred and twenty, and no longer.

Amendments made: After "1919" insert the words, "and the Aerial Navigation Acts, 1911, and 1913 and this Act may be cited together as the Air Navigation Acts, 1911 to 1919."

Leave out the word "aerial," and insert instead thereof the word "air."—[Major-General Seely.]

Title.—To make temporary provision for the regulation of aerial navigation and for purposes connected therewith.

Amendment made: Leave out the word "aerial," and insert instead thereof the word "air."—[Major-General Seely.]

Motion made, and Question proposed, "That the Bill be now read the third time."

Lieut.-Col. Moore-Brabazon: I want to ask one or two questions. The first is as to the Conference in Paris on air matters. Can the right hon. gentleman give us an assurance that the civil side will be adequately represented there as well as the naval and military? In the second place, I understand the Air Ministry has a very generous scheme of air routes and aerodromes, as well as for inspection and certification. I want to know from the right hon. gentleman whether that is to be a self-supporting organisation, and whether there is to be a charge on the companies actually using the aerodromes? I see a danger that the Air Ministry may have very good intentions, but the Treasury may not agree, and I want an assurance that Treasury agreement will be secured for any scheme the Air Ministry may put forward for the benefit of aviation.

Major-General Seely: My hon. and gallant friend asks me, in the first place, whether the civil side of aviation will be properly represented at the Conference in Paris. It will be, to an ever-increasing degree, aviation business will become civil rather than military, and if all goes well civil aviation will become the main business of the Air Ministry. It will become of far greater importance than the military side. For the moment, of course, the military side engages far more attention, because we are still at war, but the moment we get peace then we may look forward with certainty to an immense advance in aerial travel; therefore the greater part of the time of the Air Ministry will be taken up with questions of that kind. Major-General Sykes, now the Controller-General of Civil Aviation, is the member in charge of the negotiations there on the civil side, while General Trenchard will deal with the military side of the question. My hon. and gallant friend also asks with regard to our policy respecting aerodromes, and I gladly answer his question on that point. We want the assistance of the House in carrying out the policy which it is our object to pursue. We want to make flying much more safe by providing a large number of aerodromes, some of which are now military aerodromes, and will be so used, and some of which will be civil aerodromes. My hon. friend asked a specific question—who is to pay for them? The military will, of course, pay the whole of the expense of the military aerodromes, and in the case of those military aerodromes which will be exclusively confined to the military, except, of course, in cases of forced landings, there, of course, the whole cost will fall upon the State. In the case of purely civil aerodromes, I think we must show the way in providing them, but I hope that before long they will become entirely self-supporting and involve no cost to the State, except so far as we find it convenient to retain the right to land in them, and for that, of course, we shall pay. But on this topic I would not like to be asked to pledge myself more definitely. We propose, and wish to promote air travel by every possible means, and if anybody can show us a plan by which it can be made easier, safer and better, not only on these Islands, but in crossing the sea and communicating with our Dominions, we shall do our utmost to carry it out. Air travel has made considerable advance since the last occasion I spoke upon it in this House. One of our ships has been travelling in the air for 101 hours, and the speed, although it has not been conclusively computed, is estimated to have been 50 miles an hour. That means it covered a distance of over 5,000 miles, and it is possible that with continuous speed, it was more than that. During the voyage considerable winds were met. We are far less afraid of storms in the air than any ship is on the sea, whether we are in lighter- or heavier-than-air machines. There is none of the danger of the heavy overfall of a following sea. The prospect is very favourable—more favourable day by day. I can promise the hon.

and gallant gentleman that anything we can do at the Air Ministry we will not fail to do, and we shall rely upon the assistance of hon. gentlemen in this House and ask them to bring anything to our notice which can help in the forward movement. We can promise, so far as the Treasury will permit, that we will do everything possible to ensure the future and safety of civilian flying.

Lieut.-Col. Moore-Brabazon: Will the right hon. gentleman state whether inspection on certification will be a State charge?

Major-General Seely: I confess I have no answer ready to that question. We shall certainly do nothing to hinder the industry. I do not carry in my mind the rule with regard to ships, but I should think it would be reasonable to adopt a similar rule. If anyone in the House can elucidate the question and produce a suggestion, we shall be glad to consider it. For the moment I do not think it is laid down in the Regulations.

Lieut.-Col. Malone: In spite of what the right hon. gentleman has said, I have before me a particular case which does not agree with his statement. A

large commercial body submitted a scheme to the Air Ministry in which they desired assistance in opening up a route between certain districts. They received a memorandum in reply from the Air Ministry which terminated in a lot of platitudes. It said:

"The whole scheme would need careful investigation. No doubt there are difficulties. Indeed from the financial point of view it appears doubtful."

No conclusion was advised or arrived at. In a subsequent communication on this matter the authors of the scheme said:

"If Britain does not arrange a service in this locality France will."

I should like to bring this matter to the notice of the right hon. gentleman, in order to ensure that something a good deal more definite and specific may be given to these commercial bodies who seek assistance.

Major-General Seely: What is the date of that?

Lieut.-Col. Malone: February 19.

Question put, and agreed to.

Bill read the third time, and passed.



## Casualties

Lieut. ERIC BURNLER BRODIE, R.A.F., who died on February 11, at the age of 20, as the result of a flying accident at Cologne, was the eldest son of John A. Brodie, M.I.C.E., and Mrs. Brodie, Aigburth Hall, Liverpool.

Capt. HERBERT A. PATEY, D.F.C., R.A.F., died on February 18, at the age of 20, at 4, Sherriff Road, West Hampstead, of double pneumonia.

RONALD BRUCE STANLEY, R.A.F., who died on February 17, at the age of 27, at the War Hospital, Sunderland, of double pneumonia, was the eldest son of Mr. Charles Stanley, of Datchet.

Lieut. NORMAN G. STRANSOM, R.A.F., who was reported missing on the Western Front on May 10, 1918, and is now officially presumed killed on that date, was the second son of Mr. and Mrs. Stransom, of Hounslow.

Lieut. JOSEPH WATERHOUSE, R.A.F., who died on February 18, at Chisleton Camp, of pneumonia, was the eldest son of Mr. Frank Waterhouse, of Seattle, Washington, U.S.A.

## Married

Maj. AUGUSTUS WIELAND BIRD, D.S.O., R.A.F., was married on February 19, at St. George's, Hanover Square, to Miss CLARICE MARY FRENCH, daughter of the late Mr. Seth Barton French, of New York and Virginia, U.S.A., and of Mrs. Barton French, of Paris, and 3, Albemarle Street, W.

Maj. PHILIP COMYNS CARR, R.A.F., of 9, Paulton's Square, Chelsea, elder son of the late J. Comyns Carr, was married on February 11, in Paris, to LUCIE, only daughter of M. Pierre MARION, and the late Mme. Marion, of 12, Rue des Taillandiers, Paris.

Capt. W. H. HUBBARD, D.F.C., only son of Mr. and Mrs. C. H. Hubbard, Toronto, was married on February 19, at

Brompton Oratory, to Mdlle. GERMAINE DE T'SERCLAES, eldest daughter of Baron and Baroness de T'Serclaes, of Twisden, Great Chart, Kent.

Lieut. EVELYN PERCY MURRAY SHAW, R.A.F., was married on February 12, at St. Paul's, Staverton, to NORA MABEL, eldest daughter of Mr. and Mrs. Colin M. E. MAY, of Nelson House, Staverton.

Capt. WILSON TREVOR WILLIAMSON, of the R.A.F., son of Rev. Prebendary and Mrs. Williamson, of Cheltenham, was married on February 19, at the Church of the Sacred Heart, Bournemouth, to EMILY LILIAN, daughter of the late Henry MORTON-YORK, solicitor and Coroner, of Gloucester, also late of Hove, and Mrs. Morton-York, of Talbot Hurst, Bournemouth.

## To be Married

The engagement is announced, and the marriage will shortly take place, between Capt. R. MAURICE BAYLEY, D.F.C., R.A.F. (late R.N.), son of Mr. Ernest W. Bayley, of Rye, Sussex, and ENID CARE, younger daughter of Mr. and Mrs. F. T. PEAKE, Port Tewfik, Egypt.

The engagement is announced between ANTHONY WILLIAM CLARKE, junr. (late Lieut., R.F.C.), eldest son of Mr. and Mrs. Anthony Clarke, Halden House, High Halden, Ashford, Kent, and Eva, youngest daughter of Mr. and Mrs. Balfour GORDON, of Castelnau, Barnes, and Fifeshire, N.B.

The engagement is announced between Capt. A. J. ENSTONE, D.S.C., D.F.C., R.A.F., and ELSIE, only daughter of the late Mr. Arthur LILIENFELD and Mrs. Lilienfeld, of 28, Bryanston Square.

The engagement is announced between Capt. R. B. LONGRIDGE, 16th Lancers and R.A.F., son of Mr. R. C. Longridge, of Knutsford, and ALICE MARY, daughter of Capt. the Hon. and Mrs. C. T. HOLLAND, of Leamington.



## Aircraft in Mesopotamia

In his despatch dated October 1 and published as a supplement to the *London Gazette*, Lieut.-Gen. Sir W. R. Marshall, K.C.B., K.C.S.I., Commanding-in-Chief, Mesopotamian Expeditionary Force, makes the following reference to the work of the Royal Air Force:—

"The hot weather in Mesopotamia of necessity limits the sphere of activity of the Royal Air Force. Notwithstanding this, many fine long distance flights have been undertaken and valuable reconnaissances and much photographic work performed. Some idea may perhaps be gained of their wide range of action when I say that since the conclusion of the Kirkuk operations aeroplanes have been employed on various missions at places as widely separated as Samawa, on the Middle Euphrates, and Baku, in Trans-Caucasia. In fact, wherever troops have operated the pilots and observers of the Royal Air Force have invariably contributed in no small measure to their success, and their boldness and intrepidity are fully recognised by the Army."

There are one or two references in the report to aeroplane work, notably in connection with the attack on April 29 on the Yanijah Buyuk, when the 38th Infantry was supported by low-flying aeroplanes.

## The Transatlantic Flight

CAPT. HUGO SUNDSTEDT made a test flight with the machine entered for the *Daily Mail* £10,000 prize on February 21. He had proceeded a mile over Newark Bay, N.J., when engine trouble developed, but he expressed satisfaction with the way in which the machine answered the controls. Further tests will be carried out before an attempt is made made to fly to St. John's, Newfoundland.

It has been announced that Capt. Roy Francis who is in charge of the plans of the U.S. Army for an attempt to fly the Atlantic. He has been installed in the Trant Company Institution, formerly the headquarters of Count Bernstorff's propaganda department.



# THE ROYAL AIR FORCE

London Gazette, February 18.

The following temporary appointments are made at the Air Ministry:—  
**Staff Officer, 1st Class.**—Maj. C. L. Baillieu, O.B.E., and to be actg. Lieut. Col. while so employed; Feb. 11.

**Staff Officers, 2nd Class.**—(Air.)—Maj. A. R. Boyle, M.C., vice Capt. (actg. Maj.) C. M. Carington; Jan. 10. (P.)—Capt. H. H. Wahmsley, O.B.E., and to be actg. Maj. while so employed; Jan. 17. The notifications in the *Gazette* of Jan. 24 and Jan. 3 concerning 31 Maj. A. R. Boyle, M.C., are cancelled.

**Staff Officer, 3rd Class.**—Capt. H. G. Hutchinson, vice Lieut. (actg. Capt.) A. D. Finney; Feb. 12.

The following temporary appointment is made:—

**Staff Officer, 2nd Class (Higher Grade).**—(P.)—Capt. (actg. Maj.) F. T. Bridger, and to retain the actg. rank of Maj. while so employed; Dec. 13, 1918 (substituted for notification on page 201 of *Gazette*, Jan. 3).

## Flying Branch.

Lieuts. (O.) to be Lieuts. (A.):—G. D. Marks; Nov. 11, 1918. R. J. Findlay; Feb. 4.

Sec. Lieut. C. W. Smallbone to be Sec. Lieut. (A.), from (O.) Sept. 26, 1918 (substituted for notification in *Gazette*, Oct. 29, 1918).

The following Cadets are granted temp. commissions as Sec. Lieuts. (A.):—H. D. Anderson, C. G. Ball, W. E. Beam, W. A. Bell, E. V. Boyd, S. H. Bremner, E. E. Buckfield, R. F. Burnett, R. H. Cole, F. B. Common, C. E. Delaney, V. M. Delong, H. E. A. Dorse, E. S. Grant, F. T. Hall, R. E. Harrington, J. G. Heavey, F. H. Howard, J. H. Johnston, E. P. Kelly, D. A. J. M. Leck, L. Lennan, E. A. Locking, J. C. Long, C. M. Love, J. Milton, H. McC. Morden, C. C. Mounce, L. G. Murnin, W. H. McKeigan, J. B. McMartin, M. C. Oliver, R. B. Paine, W. C. Rigg, T. O. Robinson, A. Stirling, B. J. Svenceski, W. R. Usher, D. Wyman; Nov. 11, 1918.

The following Flight Cadets are granted temp. commissions as Sec. Lieuts. (A.):—F. R. Eason; Aug. 30, 1918. 55903 L. Wyeth; Sept. 30, 1918. C. F. L. Chester; Oct. 29, 1918.

R. S. Cole (Lieut., R.W. Kent R., T.F.) is granted a temp. comm. as Sec. Lieut. (K.B.), and to be Hon. Lieut.; Aug. 8, 1918.

Sec. Lieut. H. Howes (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut. (Obs. Officer); Nov. 2, 1918.

The following are granted temp. commissions as Sec. Lieuts. (Obs. Officers):—J. E. H. Chadwick (Sec. Lieut., Manch. R., T.F.); May 28, 1918. T. L. Lovell (Lieut., Lanc. Fus., T.F.), and to be Hon. Lieut.; July 15, 1918. T. L. Phillips (Temp. Sec. Lieut., R.W. Fus.); Oct. 13, 1918. T. C. Chattot (Sec. Lieut., R.G.A., S.R.); Nov. 8, 1918.

The following Cadets are granted temp. commissions as Sec. Lieuts. (O.):—W. G. Bamber, J. C. C. Dion, G. W. Knight, S. Marshall, F. G. McGinn, A. H. McLean, R. E. F. Tivy; Nov. 11.

The following Flight Cadets are granted temp. commissions as Sec. Lieuts. (Obs. Officers):—R. F. Tomlinson; Oct. 26, 1918. 179054 G. C. Jeremiah; Nov. 5, 1918.

Flight Cadet 9482 C. S. P. Davies is granted a temp. comm. as Sec. Lieut. (S.); Nov. 9, 1918.

The following relinquish their commissions on ceasing to be employed:—Sec. Lieut. (Hon. Lieut.) J. A. MacDiarmid (Lieut., Sask. R.); Dec. 11, 1918. Lieut. (Hon. Capt.) K. G. Macdonald (Capt., Can. A.P.C.); Dec. 24, 1918. Sec. Lieut. (Hon. Lieut.) G. N. Tresidder (Lieut., E. Ont. R.); Dec. 20, 1918. Lieut. V. A. Lanes (Lieut., Cent. Ont. R.); Dec. 23, 1918. Lieut. A. Sattin (Lieut., W. Ont. R.); Dec. 31, 1918. Lieut. M. S. McLean (Lieut., Nova Scotia R.); Lieut. (Hon. Capt.) A. L. Taylor (Capt., Sask. R.); Jan. 10, 1919. Sec. Lieut. J. Freeman (Lieut., Brit. C. R.); Sec. Lieut. (Hon. Lieut.) R. G. Michaelson (Lieut., E. Ont. R.); Jan. 11. Lieut. (Hon. Capt.) W. I. Bailey (Capt., Quebec R.); Jan. 13. Lieut. B. A. Cooke (Lieut., Alb. R.); Jan. 14. Lieut. J. E. King (Lieut., W. Ont. R.); Jan. 15. Sec. Lieut. (Hon. Lieut.) F. L. Mitchell (Lieut., Cent. Ont. R.); Jan. 16. Sec. Lieut. C. C. G. Logie (Sec. Lieut., Scot. Rif.); Feb. 3.

The following are transf'd. to the Unemployed List:—Lieut. A. E. Smith; Dec. 29, 1918 (substituted for notification in *Gazette*, Jan. 14). Sec. Lieut. H. Aukland, Lieut. C. H. Mather; Jan. 10. Lieut. H. B. Monaghan, Capt. S. H. Starey; Jan. 15. Lieut. D. E. Gray, Lieut. T. D. Manning, Lieut. (Hon. Capt.) (actg. Capt.) J. L. Middleton; Jan. 16. Lieut. A. A. Callaghan; Jan. 17. Lieut. N. Midgley, Lieut. G. H. Wood, M.C.; Jan. 18. Capt. C. J. Hallnam, Lieut. J. C. J. de la Ferte, Sec. Lieut. H. G. Wheeler, Sec. Lieut. R. A. Whitehead; Jan. 20. Lieut. H. J. B. Bain (A. and S. Highrs.), Sec. Lieut. H. B. Wilson; Jan. 21. Lieut. J. K. Chatham, Lieut. C. Donald (Gord. Highrs.), Lieut. C. V. Halford-Thompson; Jan. 22. Sec. Lieut. A. D. McC. Blair, Sec. Lieut. (Hon. Lieut.) H. Coverdale (Lieut., Lond. R., T.F.), Lieut. (actg. Capt.) N. C. Jones, D.F.C. (Lieut., R.F.A., T.F.), Sec. Lieut. A. K. Shuffelbotham, Lieut. W. A. Stillwell; Jan. 23. Sec. Lieut. K. B. Allan, Sec. Lieut. (Hon. Lieut.) R. Auld (Lieut., R. Sco. Fus.); Lieut. R. De La Bere, Sec. Lieut. J. M. Clarke, Sec. Lieut. D. Mumford, Sec. Lieut. L. G. C. Perryer, Sec. Lieut. B. L. Washington; Jan. 24. Sec. Lieut. (Hon. Lieut.) R. P. Alday, Sec. Lieut. G. McK. Craig, Sec. Lieut. N. H. C. Loft, Sec. Lieut. T. D. Sykes, Lieut. A. G. Warner; Jan. 25. Capt. A. M. Harding, Lieut. D. J. Pilmore-Bedford, Lieut. A. H. Welsh, Sec. Lieut. C. Whitehead; Jan. 26. Lieut. W. Hill; Jan. 27. Lieut. L. H. Cryer, Sec. Lieut. A. R. Lees (Lond. R., T.F.); Jan. 28. Lieut. H. A. Chippindale, M.C. (R.F.A., T.F.), Sec. Lieut. E. A. Devine, Lieut. (Hon. Capt.) A. A. Greenslade (S. Lanc. R.), Sec. Lieut. J. W. Hill, Lieut. A. Parsons, Sec. Lieut. H. Pattinson, Lieut. J. C. Tusting; Jan. 29. Lieut. B. Adie (R.W. Kent R.), Sec. Lieut. V. F. Dorey, Lieut. A. T. Edem-Edon (N. Staffs. R.), Lieut. F. Ellam, Lieut. A. A. English, M.C., Lieut. S. C. Eschmann (Suff. R.), Sec. Lieut. G. M. Ferguson, Lieut. S. T. Francis, Sec. Lieut. J. W. Hamilton, Sec. Lieut. G. Kaines, Thomas; Jan. 30. Sec. Lieut. P. Bebbington, Sec. Lieut. E. M. Boxer-Lieut. J. B. Carr (Middx R.), Sec. Lieut. I. H. Christie, Sec. Lieut. D. A. Colquhoun, Lieut. J. C. C. Cotes, Sec. Lieut. C. A. L. Coutts, Capt. F. Dunn, Lieut. W. L. Gopill, Lieut. (actg. Capt.) H. A. Hamersley, M.C., Sec. Lieut. (Hon. Lieut.) A. O. Helps (Som. L.L.); Jan. 31. Sec. Lieut. H. Holmes (date of 1st comm. Aug. 10, 1918). Sec. Lieut. A. J. Attwood, Sec. Lieut. J. B. Boyter, Lieut. A. C. Coombs, Lieut. E. Everatt, Sec. Lieut. A. B. Fee, Sec. Lieut. A. C. Fenn, Lieut. J. Frost, Sec. Lieut. W. Ginger, Sec. Lieut. R. A. Grant, Maj. W. G. Moore, Sec. Lieut. (Hon. Lieut.) A. C. Orchin, Sec. Lieut. H. S. Philp, Lieut. T. B. Wallas; Feb. 1. Lieut. K. D. Campbell, Maj. W. E. F. Davidson, Sec. Lieut. W. Denham, Sec. Lieut. H. G. Daulton, Lieut. C. M. Davis, Sec. Lieut. L. A. Dodge, Lieut. T. F. Everitt, Capt. C. Faber, Sec. Lieut. W. Garbett (E. Yorks R.), Lieut. D. S. Glover, Lieut. (actg. Capt.) F. M. Hicks, Lieut. M. A. Heabb, Capt. W. R. Hoare (Capt., Hants R., T.F.), Sec. Lieut. A. Holdsworth, Lieut. R. H. Humphries, Lieut. G. Knight, Sec. Lieut. J. C. Lawrence, Sec. Lieut. C. A. Lucy, Lieut. L. A. Wingfield (R. Fus.); Feb. 2. Lieut. O. H. Cantrill, Sec. Lieut. (Hon. Maj.) E. Crewdson (Maj., R.E.), Sec. Lieut. R. A. Forth; Feb. 3. Lieut. C. G. Davenport (R.F.A., T.F.), Capt. T. S. Edleston, Sec. Lieut. J. W. Elder,

Sec. Lieut. W. G. Gardner, Sec. Lieut. R. D. Hambrook, Sec. Lieut. R. Ingram, Sec. Lieut. J. MacLusky, Sec. Lieut. (Hon. Lieut.) J. R. Orton, Sec. Lieut. F. Priestman, Sec. Lieut. P. A. Sainsbury, Sec. Lieut. R. C. Umack, Sec. Lieut. De La Virgine, Sec. Lieut. H. S. Wills; Feb. 4. Sec. Lieut. E. G. Emery, Sec. Lieut. B. V. Featherstonhaugh, Lieut. W. J. Greenslade, Lieut. (actg. Capt.) F. Hobson, M.C., Sec. Lieut. S. B. Howson, Lieut. J. T. P. Jeyes, Lieut. H. C. Kent, Lieut. (Hon. Capt.) L. Laing (D.L.I., T.F.), Capt. G. V. Leather, Lieut. V. Z. Stone, Lieut. H. O. Thomas, Lieut. W. J. Walford, Lieut. J. H. Wilkinson, Lieut. H. S. Wright; Feb. 5. Sec. Lieut. G. Bannerman, Lieut. N. T. Croft (Lond. R.), Lieut. R. H. Cross (D. of Lancs. Own Yeo., T.F.), Sec. Lieut. D. Mannors; Feb. 6. Sec. Lieut. (Hon. Lieut.) P. R. Ambrose (Essex R.), Sec. Lieut. A. E. Button, Sec. Lieut. A. H. Duggan, Lieut. R. J. MacLachlan, Sec. Lieut. W. Manning, Capt. W. H. Peirce, Lieut. A. J. D. Peebles, Lieut. L. S. Skevington; Feb. 7. Lieut. D. S. MacKenzie, Sec. Lieut. G. C. Noble, Sec. Lieut. T. P. Wheatley; Feb. 8. Sec. Lieut. G. M. E. Bennett, Sec. Lieut. (Hon. Lieut.) A. H. Waddy (Bedf. R.); Feb. 9. Lieut. D. I. Davies, Sec. Lieut. J. H. Nicholass; Feb. 11. Sec. Lieut. H. Mercer; Feb. 12. Sec. Lieut. P. S. Crovat; Feb. 15. Lieut. E. H. Cutbill, Lieut. (Hon. Capt.) A. de Selincourt; Feb. 16. Capt. D. M. S. Watson; Feb. 17.

Capt. L. U. D. Truman relinquishes his comm. on account of ill-health; contracted on active service, and is permitted to retain the rank of Capt.; Feb. 19.

Lieut. R. W. J. Weeks relinquishes his comm. on account of ill-health, and is permitted to retain the rank of Lieut.; Feb. 19.

Sec. Lieut. J. W. Taylor relinquishes his comm. on account of ill-health, and is permitted to retain the rank of Sec. Lieut.; Jan. 27 (substituted for notification in *Gazette*, Jan. 7).

Sec. Lieut. H. W. Robinson relinquishes his comm. on account of ill-health contracted on active service, and is permitted to retain the rank of Sec. Lieut.; Feb. 19.

Lieut. T. H. R. Riggs is antedated in his appointment as Sec. Lieut. (O.) to April 20, 1918.

Sec. Lieut. E. G. Corey is antedated in his appointment as Sec. Lieut. (A. and S.); May 28, 1918 (substituted for notification in *Gazette*, Oct. 22, 1918, page 12,494).

The notification in *Gazette*, Dec. 24, 1918, concerning Sec. Lieut. E. F. Murphy is cancelled.

The name of John Frederick Young is as now described and not F. J. Young as stated in *Gazette* May 24, 1918.

The surname of No. 75720 A. T. Reid is as now described, and not as in *Gazette*, Nov. 15, 1918.

The Christian names of Sec. Lieut. John Harrison Gardner are as now scribed and not as in *Gazette*, Jan. 24.

The initials of Sec. Lieut. K. E. Allan are as now described and not as in *Gazette*, Sept. 17, 1918.

## Administrative Branch.

Lieuts. to be actg. Capt. while employed as Capt.:—E. N. T. Edwardes; Feb. 1. D. F. Hurr, M.C.; Feb. 11.

Sec. Lieut. H. Baker to be actg. Capt. while employed as Capt.; Feb. 1. W. J. T. Wright (Lieut., Can. Ry. Serv.) is granted a temp. comm. as Lieut.; Aug. 21, 1918, seniority from April 1, 1918.

Sec. Lieuts. to be Sec. Lieuts., from (A.):—L. E. Walmsley; Dec. 17, 1918. J. McAuley; Jan. 10. (Hon. Capt.) G. H. Blake, D.C.M.; Feb. 8, and to be Hon. Capt.

Sec. Lieut. H. D. Thornton to be Sec. Lieut., from (A. and S.); Nov. 26, 1918.

Sec. Lieut. H. S. Downs to be Sec. Lieut., from (T.); June 15, 1918.

Sec. Lieuts. to be Sec. Lieuts., from (O.):—H. Ridley; Nov. 19, 1918. T. N. Drake; Nov. 22, 1918. E. H. Cooke; Dec. 3, 1918. T. Stockdale; Jan. 2.

Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts.:—H. O. Warren; Nov. 25, 1918. H. T. Joy; Feb. 8.

G. D. Ashby (Sec. Lieut., R.G.A., S.R.) is granted a temp. comm. as Sec. Lieut.; July 16, 1918, and with seniority from April 1, 1918.

The following relinquish their commissions on ceasing to be employed:—Lieut. C. E. Vickers (Temp. Asst. Paymr., R.N.R.); Sept. 14, 1918. Lieut. (actg. Capt.) C. F. Apthorp; Feb. 3 (and is permitted to retain the rank of Capt.).

The following are transf'd. to Unemployed List:—Sec. Lieut. S. A. Mountain; Jan. 7. Lieut. C. J. Killeen; Jan. 11. Lieut. C. L. Shaw; Jan. 13. Sec. Lieut. S. H. Adams, Sec. Lieut. W. F. Ayrton, Sec. Lieut. P. Geach; Jan. 21. Sec. Lieut. S. G. Ball, Sec. Lieut. J. W. Stevens; Jan. 22. Sec. Lieut. R. P. Cobb; Jan. 24. Sec. Lieut. B. Bosker, Sec. Lieut. T. E. Coppinger, Sec. Lieut. G. Crouch; Jan. 25. Sec. Lieut. W. H. Carling, Lieut. R. W. Coop, M.C., Lieut. H. E. Gooding, Lieut. (actg. Capt.) H. Jeffries, Sec. Lieut. W. F. D. Welch; Jan. 26. Sec. Lieut. P. C. V. Halliwell; Jan. 28. Sec. Lieut. A. Bragg, Sec. Lieut. J. Flett, Sec. Lieut. W. Marklew; Jan. 29. Sec. Lieut. A. E. Edwards; Jan. 30. Lieut. E. R. Childe-Freeman, Sec. Lieut. A. K. Dawson, Lieut. E. L. French, Sec. Lieut. (actg. Capt.) H. M. Woodhouse; Jan. 31. Lieut. W. E. Cutlan, Sec. Lieut. H. Oliver, Sec. Lieut. F. E. Phelps; Feb. 1. Lieut. (actg. Capt.) E. G. Etheridge, Sec. Lieut. W. Ersley; Feb. 2. Sec. Lieut. A. Mackie; Feb. 3. Sec. Lieut. L. de B. Lewis; Feb. 4. Sec. Lieut. G. A. Bainbridge, Sec. Lieut. W. E. Burhill, Lieut. (actg. Maj.) R. L. Briscoe, Lieut. S. C. Conner, Sec. Lieut. E. Drummond; Feb. 5. Sec. Lieut. (actg. Lieut.) G. E. Valentine; Feb. 6. Lieut. L. V. Marchant; Feb. 7. Lieut. W. R. Haggas, Sec. Lieut. B. S. Tydd; Feb. 8.

Sec. Lieut. (actg. Capt.) H. L. Nelson; Feb. 11.

Capt. (actg. Maj.) H. W. R. Haselhurst relinquishes his comm. on account of ill-health caused by wounds, and is permitted to retain the rank of Maj.; Feb. 19.

The following Lieuts. relinquish their commissions on account of ill-health, and are permitted to retain their rank:—V. B. Allen, L. Smith (contracted on active service); Feb. 19.

Sec. Lieut. (actg. Lieut.) B. W. Swan relinquishes his comm. on account of ill-health contracted on active service, and is permitted to retain the rank of Lieut.; Feb. 19.

Sec. Lieuts. relinquish their commissions on account of ill-health, and are permitted to retain their rank:—S. R. S. Burnett, F. J. A. Cooper, E. M. Prowse (contracted on active service), A. C. Mitchell; Feb. 19.

Sec. Lieut. F. G. Corbett is antedated in his first appointment as Sec. Lieut. from Aug. 18, 1918.

Sec. Lieut. G. W. Heugh is antedated in his first appointment as Sec. Lieut. from Aug. 18, 1918.

## Technical Branch.

C. A. Brown (Lieut., R.N.V.R.) is granted a temp. comm. as Capt. (Grade A.); Sept. 8, 1918.

Lieut. (Hon. Maj.) E. N. L. White to be actg. Capt. while employed as Capt. (Grade A.); Oct. 1, 1918 (substituted for notification in the *Gazette*, Oct. 4, 1918).

Lieut. C. B. Dolphin to be Sec. Lieut. (Grade A.), from (Ad.), and to be Hon. Lieut.; May 8, 1918.

Sec. Lieut. J. Nairn to be Sec. Lieut. (Grade A.), from (Ad.); Jan. 1. J. C. Howard (Temp. Sec. Lieut., Labour Corps) is granted a Temp. commn. as Sec. Lieut. (Grade A.); Aug. 19, 1918, and with seniority from April 1, 1918.

Sec. Lieuts. to be Sec. Lieuts. (Grade B.), from (Ad.):—J. Johnstone; Nov. 1, 1918. A. H. Jackson; Jan. 24. H. E. Young; Feb. 4. F. O. Finn; Feb. 6.

Sec. Lieut. R. D. Clerk (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut. (Grade B.); June 1, 1918.

J. R. Cross (Temp. Sec. Lieut., R.E.) is granted a temp. commn. as Sec. Lieut.; Sept. 9, 1918 (substituted for notification in *Gazette*, Oct. 29, 1918).

Sec. Lieut. (Hon. Lieut.) W. L. Heape (Lieut., E. Lancs. R.) relinquishes his commn. on ceasing to be employed; Dec. 11, 1918.

The following are transfd. to Unemployed List:—Sec. Lieut. W. A. Gaze; Jan. 11. Sec. Lieut. (Hon. Lieut.) R. G. Campbell; Jan. 15. Sec. Lieut. (Hon. Lieut.) H. Forbes, Sec. Lieut. (Hon. Lieut.) W. F. Peatfield; Jan. 17.

Lieut. (actg. Capt.) A. D. Broughton; Jan. 18. Sec. Lieut. P. F. Garnett; Jan. 19. Sec. Lieut. A. M. Coombs, Lieut. E. C. Richardson; Jan. 21.

Sec. Lieut. J. K. Bell, Lieut. F. W. Roberts, Sec. Lieut. (Hon. Lieut.) S. A. Salmon; Jan. 23. Lieut. F. S. Smith; Jan. 25. Sec. Lieut. S. H. Cummings; Jan. 26. Maj. F. W. Gardiner, Lieut. W. H. Griffith; Jan. 29.

Lieut. (actg. Capt.) C. A. Christmas, Sec. Lieut. T. Goulding; Jan. 30. Sec. Lieut. F. Baxter, Lieut. H. F. Fulford; Jan. 31. Sec. Lieut. H. A. Blackburn, Lieut. C. Boyd, Sec. Lieut. J. L. Carter-Cherry, Sec. Lieut. (Hon. Lieut.) (actg. Capt.) G. H. Crick, Sec. Lieut. A. Dunderdale, Capt. J. H. Dunn, Sec. Lieut. A. M. D. Falconer, Lieut. (actg. Capt.) R. W. Jepson, Lieut. (actg. Capt.) C. S. Johnston, Lieut. G. D. Morris, Sec. Lieut. R. Peel;

Feb. 1. Maj. E. M. L. Ainslie, M.B.E., Sec. Lieut. A. J. Knight; Feb. 2. Lieut. J. Goodenough; Feb. 3. Sec. Lieut. R. M. Adam, Lieut. G. W. Charley, Maj. P. L. H. Dodson, Lieut. W. Hamilton; Feb. 4. Lieut. M. B. Brown, Sec. Lieut. W. Johnstone, Lieut. L. W. Mather; Feb. 5. Lieut. C. B. D. Campbell, Lieut. D. Easdale, Sec. Lieut. L. Evans, Lieut. A. G. Hall, Lieut. A. W. H. Osborne, Maj. A. F. Sidegreaves; Feb. 6. Lieut. O. M. D. Bell, Sec. Lieut. P. F. Dorte, Sec. Lieut. J. M. Floyd, Sec. Lieut. H. S. Gain, Sec. Lieut. (Hon. Lieut.) J. S. D. Harries-Jones; Feb. 7. Capt. B. J. S. Brown; Feb. 8. Lieut. S. S. Scott; Feb. 9. Maj. R. V. C. Brook;

Feb. 11.

Sec. Lieut. J. O. Trinder is removed from the Service, his Majesty having no further occasion for his services as an officer; Jan. 10.

Lieut. (actg. Capt.) W. T. Taylor relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Capt.; Feb. 19.

The surname of Sec. Lieut. G. W. U. Clissold is as now described, and not as stated in the *Gazette* of Dec. 13, 1918.

The initials of G. W. Webb are as now described, and not as stated in the *Gazette* of Feb. 4.

The notification in the *Gazette* of Jan. 7 concerning Lieut. (actg. Capt.) W. T. Taylor is cancelled.

## Chaplains Branch.

Principal Chaplain for Roman Catholics.—Rev. J. Dey, D.S.O. (Chap., A.C.D.), is granted a permanent commn. as Chaplain, with the relative rank of Lieut.-Col., and is granted the relative rank of Col. whilst employed as Principal Chaplain; Dec. 9, 1918.

Rev. B. W. Keymer, O.B.E. (Temp. Chap. to the Forces, 4th Class, A.C.D.), is granted a temp. commn. as Chaplain with the relative rank of Capt., and to be Deputy Chaplain-in-Chief, with the relative rank of Col. whilst so employed; Feb. 18.

The following temporary appointment is made:—

Assistant Principal Chaplain for Wesleyans.—Rev. J. S. Hobson (A.C.D.), and is granted a temp. commn. as Chaplain, with the relative rank of Capt. and is granted the relative rank of Maj. whilst employed as Asst. Principal Chaplain; Feb. 3.

Rev. W. J. Selby relinquishes the appointment of Deputy Chaplain-in-Chief; Feb. 17.

## Memoranda.

Capt. H. G. Day to be actg. Maj. whilst holding a special appointment at the Ministry of Munitions; Jan. 22.

Capt. G. M. F. O'Brien, D.S.C., is confirmed in his rank as Capt.

Lieuts. to be actg. Capt. while holding special appointments at the Ministry of Munitions:—S. H. Hawes, E. L. Ravenscroft; Dec. 1, 1918. A. E. Thorne, C. W. Winwood-Smith; Jan. 1.

Lieuts. to be Hon. Capt.:—W. Clay, W. J. Jones.

Sec. Lieuts. to be Lieuts., but without pay and allowances of that rank:—H. R. Horswill; Dec. 1, 1918. (Hon. Lieut.) (actg. Lieut.) V. H. Tait; Jan. 1.

The following are transfd. to Unemployed List:—Lieut. (actg. Capt.) A. W. Chapman, from (S.O.); Jan. 17. Sec. Lieut. (actg. Capt.) A. A. Longworth, from (S.O.); Feb. 2. Capt. (actg. Maj.) H. G. St. J. Brodrick, M.C., from (S.O.); Feb. 5. Capt. B. W. Bentinck; Feb. 8. Capt. W. P. Nicholls, from (S.O.); Feb. 9. Capt. H. E. Steinberg, from (S.O.); Feb. 12.

Capt. (actg. Lieut.-Col.) R. B. Bourdillon, M.C., A.F.C., from (S.O.); Feb. 15.

Sec. Lieut. (actg. Lieut.) W. R. Simpson relinquishes his appointment as S.O., and actg. rank of Lieut.; Jan. 1.

## London Gazette, February 21.

The following temporary appointments are made at the Air Ministry:—

Staff Officer, 1st Class (Air).—Lieut.-Col. R. A. Wilson, D.S.O.; Feb. 1.

Staff Officer, 3rd Class (P.).—Capt. P. A. Moodie; Jan. 13. Lieut. J. B. Sharples, M.B.E.; Feb. 1 (and to be actg. Capt. while so employed). Capt. C. J. Marchant; Feb. 10.

The following temporary appointment is made:—

Staff Officer, 1st Class.—(To be graded for pay at Air Ministry rates).—Maj. D. Harries, and to be actg. Lieut.-Col. while so employed, vice Maj. (actg. Lieut.-Col.) F. W. Lucas, M.C.; June 26, 1918 (substituted for notification in *Gazette* Aug. 20, 1918).

The date of appointment of Capt. (actg. Lieut.-Col.) A. J. Child, M.C., is May 3, 1918, and not as in *Gazette* May 21, 1918.

The date of appointment of Capt. (actg. Lieut.-Col.) F. S. Isaac is May 19, 1918, and not as in *Gazette* June 7, 1918.

Staff Officer, 4th Class (2nd Grade).—The date of appointment of Lieut. C. T. S. Mendi is April 27, 1918, and not as in *Gazette* Jan. 14.

The date of appointment of Lieut. P. B. Fricker is June 6, 1918, and not as stated in *Gazette* Jan. 14.

## Flying Branch.

Capt. W. W. Carey-Thomas, M.C., to be actg. Maj. (A.) while specially employed; Feb. 5.

Capt. to be actg. Maj. while employed as Maj. (A.):—M. B. Blake; Aug. 1, 1918. W. E. G. Murray; Sept. 16, 1918. J. A. Coats, A.F.C.; D. U. McGregor, M.C., R. H. B. Kerr, H. A. B. Robb, M.C., A.F.C.; Sept. 23, 1918. C. D. Fellowes, M.C., A.F.C., J. C. R. Firih, M.C., A. Goodiellow, G. L. Lloyd, M.C., from (I.), E. J. Watkins; Oct. 1, 1918. G. A. Turton; Nov. 1, 1918. M. R. N. Jennings, M.C.; Dec. 27, 1918.

Lieuts. (actg. Capt.) to be actg. Maj. while employed as Maj. (A.):—

F. G. Garratt; Sept. 23, 1918. J. E. Bonnicksen; Oct. 1, 1918. M. M. Sisley, A.F.C.; Nov. 1, 1918.

Capt. N. G. Stewart-Dawson, D.S.C., to be actg. Maj. while employed as Maj. (A. and S.); Oct. 1, 1918.

Capt. R. J. Slade, D.S.C., to be graded for pay as Capt. while employed; as Capt. (O.); Jan. 31.

Lieuts. to be actg. Capt. while employed as Capt. (A.):—F. L. B. Hebbert; June 1, 1918. E. S. Duggan, R. N. Swann; Aug. 1, 1918. E. Haigh; Aug. 31, 1918. E. J. A. Burke, D. Coates, D. S. Glover, J. H. Gotch, A.F.C. (Hon. Capt.) W. Petre, (Hon. Capt.) R. S. Witehell, A. M. Wray, M.C., A.F.C.; Sept. 1, 1918. P. R. T. Chamberlayne, A.F.C., T. C. Clifford, W. R. Cox, M.C., B. F. G. Cunliffe, G. Eastwood, W. P. Eastwood, R. E. Heath, A. E. Hedges, D. A. F. Hilton, M.C., W. F. Hamilton, C. W. Hamilton, H. P. M. Kesteron, M.C. (Hon. Capt.), W. L. Lister, S. B. Martin, T. Marburg, A.C.F., W. G. B. McKechnie, R. J. Stubington, B. R. Vertannes; Oct. 1, 1918. W. Dancy, J. L. Horne, A.F.C., G. N. Prout, W. A. McMichael, D. A. Savage, M.A.; Oct. 2, 1918. G. W. Ferguson, M.C., R. J. Housden; Nov. 1, 1918. H. Hercock; Nov. 21, 1918. E. D. Mackay; Jan. 8.

Lieut. R. S. Davies to be actg. Capt. while employed as Capt. (O.); Oct. 1, 1918.

Lieut. G. A. Binning to be Lieut. (A.) from (O.); Jan. 4.

Sec. Lieut. H. N. Hasler to be Sec. Lieut. (A. Ship) from (T. Grade A.); Oct. 14, 1918.

Flt. Cadet 117366 S. Barker is granted a temp. commn. as Sec. Lieut. (A.); Aug. 29, 1918.

Flt. Cadet 227739 R. Morrison is granted a temp. commn. as Sec. Lieut. (A.); Oct. 18, 1918.

F. Smith (Temp. Sec. Lieut., York. L.I.) is granted a temp. commn. as Sec. Lieut. (A.); May 27, 1918 (substituted for notification in *Gazette*, June 28, 1918, concerning L. T. Smith).

The following Prob. Officers (late R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (A.):—L. E. Pocock; May 19, 1918. H. E. Barry; July 8, 1918. E. B. F. Auld; July 14, 1918. E. H. S. Tye; Oct. 12, 1918.

P. de Coninck (late Sub-Lieut., R.N.V.R.) is granted a temp. commn. as Sec. Lieut. (A.); Oct. 29, 1918.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (O.):—A. G. Middleton; June 1, 1918. S. Jones; June 5, 1918. J. H. M. Woods; Aug. 8, 1918 (substituted for notification in *Gazette* Jan. 10). R. H. Craig; Aug. 8, 1918 (substituted for notification in *Gazette* Jan. 10).

The following Flight Cadets are granted temp. commns. as Sec. Lieuts. (O.):—137567 A. P. Hancock; Aug. 31, 1918. A. Toes (since killed); Sept. 20, 1918.

The following are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—

A. R. Cowan (Temp. Lieut., Res. R. of Cav.), and to be Hon. Lieut.; April 1, 1918. S. T. Goodman, M.C., D.C.M. (Temp. Capt., R. Fus.), and to be Hon. Capt.; July 6, 1918 (substituted for notification in *Gazette* July 12, 1918).

F. W. Ross (Sec. Lieut., R. War. R., T.F.); Nov. 2, 1918.

The following Prob. Obs. Officers (R.N.A.S.) are granted temp. commns. as Sec. Lieuts. (Obs. Officers):—J. A. Ellis, J. M. Dunn; April 4, 1918. L. A. Thrower, C. J. Lewis; April 25, 1918. J. G. M. Farrall, R. H. S. Calver; May 6, 1918. R. C. Emmett; May 25, 1918. G. L. Comba, S. King; July 18, 1918.

The following relinquish their commns. on ceasing to be employed:—Lieut. P. S. Birkbeck, Sec. Lieut. R. L. Davies; July 13, 1918. Lieut. J. F. Lewall (Lieut., Brit. Col. R.); Jan. 10. Lieut. H. L. Polson (Lieut., Can. M.G.C.); Sec. Lieut. (Hon. Lieut.) D. W. Stewart (Lieut., W. Ont. R.); Jan. 11.

Lieut. D. M. Christie (Lieut., Can. Forces), Sec. Lieut. (Hon. Lieut.) H. M. Fulton (Lieut., Nova Scotia R.), Sec. Lieut. (Hon. Lieut.) S. H. Munro (Hon. Lieut., Y.M.C.A., C.E.F.); Jan. 13. Lieut. L. L. Barnhill (Lieut., Nova Scotia R.); Jan. 22. Lieut. R. C. Farrow (Lieut., Can. Field Art.); Jan. 29.

Lieut. H. A. McCormick (Lieut., Nova Scotia R.); Jan. 30. Lieut. R. C. Pitman (Lieut., Nova Scotia R.); Feb. 1. Lieut. H. S. Hill (Lieut., Lincoln R., T.F.), Sec. Lieut. J. J. Palmer (Lond. R.); Feb. 3. Capt. R. M. Findlay (Lieut., County of Lond. Yeo.), Sec. Lieut. (Hon. Capt.) M. Savill (Capt., R. W. Surr. R.), Lieut. E. S. Seaton (Lieut., Lond. R.); Feb. 4. Sec. Lieut. F. W. C. Elles (Temp. Sec. Lieut., Ind. Army); Feb. 8.

The following are transfd. to the Unemployed List:—Lieut. S. Harlow; Jan. 15. Lieut. B. S. Allen, Sec. Lieut. T. S. Anderson; Jan. 21. Capt. H. Lawson (substituted for notification in *Gazette* Feb. 7). Lieut. L. M. Y. Williams (Lond. R.), Sec. Lieut. F. K. Wilson; Jan. 23. Lieut. (actg. Capt.) H. C. R. Owen, Sec. Lieut. L. A. Wilson; Jan. 24. Lieut. (actg. Capt.) J. E. Addinsell, Lieut. N. V. Clarke, Sec. Lieut. (Hon. Lieut.) C. W. Murray (Queen's Own R., Glas. Yeo., T.F.), Sec. Lieut. H. J. E. Whitefield, Sec. Lieut. A. W. Yardley; Jan. 25. Sec. Lieut. W. Howarth; Jan. 26. Lieut. K. G. P. Hendrie, Sec. Lieut. H. T. Parsons; Jan. 27. Lieut. J. F. A. Baker; Jan. 28.

Sec. Lieut. W. I. Bannatyne, Sec. Lieut. P. D. Brookes (Lond. R., T.F.), Sec. Lieut. W. E. Hall, Sec. Lieut. L. B. Jordan; Jan. 29. Lieut. G. F. Burns, Lieut. S. T. Butteris, Sec. Lieut. J. A. C. Critchley, Sec. Lieut. A. R. Crosthwaite; Jan. 30. Lieut. R. M. Anderson (High L.I.), Lieut. C. E. E. Boulton, Sec. Lieut. W. S. Brooks, Sec. Lieut. A. E. Brown, Lieut. (actg. Capt.) E. D. Clarke, Sec. Lieut. A. H. Combs, Lieut. F. N. Harrison, Capt. J. P. Inglesfield, Sec. Lieut. (actg. Capt.) R. Jackson, Lieut. J. Langlands, Sec. Lieut. A. Laskey; Jan. 31. Sec. Lieut. A. H. Derby, Lieut. C. A. Hutchins, Sec. Lieut. (Hon. Lieut.) G. L. S. Lighthoot, Sec. Lieut. F. H. Redfern, Lieut. (actg. Capt.) G. B. Solomon, Lieut. O. H. C. Webb; Feb. 1. Lieut. P. S. Bell, Sec. Lieut. (Hon. Lieut.) J. C. Burbidge (Rifle Bde.), Sec. Lieut. C. J. Clarke, Sec. Lieut. F. T. Cockburn, Lieut. S. J. C. Ellis, Sec. Lieut. G. Harvey, Lieut. K. J. P. Laing, Lieut. G. W. White, Lieut. (Hon. Capt.) L. D. B. Monier-Williams; Feb. 2. Lieut. (actg. Capt.) J. L. S. Gih (Lanc. Fus.).

Sec. Lieut. W. F. Gibson, Sec. Lieut. L. W. Lauchbury, Sec. Lieut. C. W. J. Lawrence, Sec. Lieut. D. E. Llewellyn, Lieut. L. R. Tait-Cox; Feb. 3. Sec. Lieut. D. S. Davies, Lieut. H. L. Groom, Lieut. H. M. Harris (Lieut., R. Scots), Lieut. (Hon. Capt.) G. St. G. Sedall (Lond. Yeo., T.F.), Sec. Lieut. F. G. Stevens; Feb. 4. Lieut. A. H. Berg, Lieut. L. E. Bickel, Sec. Lieut. E. H. Brand, Sec. Lieut. R. Carnie, Lieut. J. K. Carruth, Sec. Lieut. A. E. Connolly, Sec. Lieut. G. N. Dixon, Lieut.-Col. I. Fraser, Sec. Lieut. J. D. Graham, Sec. Lieut. W. H. Greaves, Sec. Lieut. E. Groves, Lieut. W. R. McMenan, Sec. Lieut. L. F. Newnham, Lieut. H. R. Watt; Feb. 5. Sec. Lieut. (Hon. Capt.) P. Bell (R. Welsh R., T.F.), Sec. Lieut. S. W. W. Field, Lieut. J. J. C. Hamman, Lieut. H. Howard, M.C., Sec. Lieut. A. H. McIntyre, Lieut. D. C. C. Murray (R.E., T.F.), Lieut. S. H. Vickers, Sec. Lieut. A. H. Weston, Sec. Lieut. R. J. O. Wilson, Lieut. R. W. Whalley; Feb. 6. Sec. Lieut. L. F. Hill, Lieut. O. Matson; Feb. 7. Capt. (actg. Maj.) H. H. Balour, M.C. (K.R. Rit. C., S.R.), Lieut. A. E. Fitness, Maj. O. T. Gnosspeliu, Lieut. C. M. Hallett, Lieut. S. E. Hancox, Sec. Lieut. C. De Laubenque, Sec. Lieut. F. K. Langton, Lieut. L. P. Smith, Sec. Lieut. W. J. Wilkinson, Lieut. G. Wood, Lieut. S. Wright; Feb. 8. Sec. Lieut. R. J. Davey, Sec. Lieut. H. S. Ellis, Lieut. J. M. E. Murray; Feb. 9. Lieut. (Hon. Capt.) E. Beadon, Lieut. H. Dewhurst, Lieut. O. J. Hargrave, Sec. Lieut. L. N. Mudditt, Sec. Lieut. H. Pritchett, Sec. Lieut. B. Rhodes, Lieut. J. L. Toyne; Feb. 10. Lieut. A. A. Battison, Lieut. G. S. Chesler, Sec. Lieut. J. A. Holmes, Sec. Lieut. (Hon. Lieut.) A. Le Blanc, Lieut. C. R. Sands (Sher. For.), Sec. Lieut. B. Smulian, Sec. Lieut. E. Wilman, Lieut. (actg. Capt.) P. C. A. Wright; Feb. 11. Sec. Lieut. J. H. Marland; Feb. 12. Capt. F. Webb; Feb. 13. Sec. Lieut. A. Balstow; Feb. 14. Lieut. R. C. Taylor (Temp. Sec. Lieut., K. War. R.); Feb. 16. Lieut. S. G. Spiro; Feb. 19.



Capt. D. K. Johnstone relinquishes his commn. on account of ill-health and is permitted to retain the rank of Capt.; Feb. 22.

The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—S. Anderson (High. L.I.) (caused by wounds), W. C. Gibbard, C. F. Muirhead (contracted on active service), E. H. Tredcroft (contracted on active service); Feb. 22.

Lieut. E. O. Perry (Lieut., Notts. and Derby, T.F.), relinquishes his commn. on account of ill-health contracted on active service; Feb. 22.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—W. A. Bune (contracted on active service), G. A. Cameron, H. Drummond-Wolff (contracted on active service), J. R. Johnson, E. Willis (contracted on active service); Feb. 22.

The notification in *Gazette* May 31, 1918, concerning Capt. S. T. Ravenscroft is cancelled.

The notification in *Gazette* Nov. 22, 1918, concerning Lieut. L. J. N. Mackay is cancelled.

The notification in *Gazette* Jan. 14 concerning Sec. Lieut. P. C. Drummond is cancelled.

The notification in *Gazette* June 11, 1918, concerning Sec. Lieut. A. C. Kermodie is cancelled.

The notification in *Gazette* Feb. 4 concerning Lieut. W. C. Marsh is cancelled.

Sec. Lieut. W. H. Oldfield is antedated in his appointment as Sec. Lieut. (O.); July 23, 1918.

#### Administrative Branch.

A. H. C. Kearsey, D.S.O., (Maj., Hrs.), is granted a temp. commn. as Maj., seniority April 1, 1918, and to be actg. Lieut.-Col. while employed as Lieut.-Col.; Sept. 17, 1918.

Capt. (Hon. Maj.) H. B. Nutting to be actg. Lieut.-Col. while employed as Lieut.-Col.; Oct. 8, 1918 (substituted for notification in *Gazette*, Dec. 20, 1918).

Cpts. to be actg. Maj. while employed as Maj.:—M. A. Seymour; Oct. 1, 1918. F. H. Hawksford, from (T.); Nov. 1, 1918. F. R. P. Dexter; Nov. 13, 1918.

The following are granted temp. commns. as Cpts.:—L. E. Innes-Baillie (Temp. Capt., R. Mar.); April 1, 1918. T. M. Ross (Maj. and Qmr., R. Sco. Greys), and to be hon. Maj. (substituted for notification in *Gazette*, Feb. 14). F. R. P. Dexter (Temp. Capt., Yorks. L.I.); June 4, 1918, seniority April 1, 1918.

Capt. G. Aste to be Capt., from (S.O.); Jan. 28.

Lieut. (actg. Capt.) S. Ransom retains the actg. rank of Capt. while employed as Capt., from (T.); Jan. 3.

Sec. Lieut. (actg. Capt.) J. F. Kerr to be graded for purposes of pay as Capt. while employed as Capt., from (T.); Sept. 1, 1918.

Lieuts. to be actg. Cpts. while employed as Cpts.:—A. A. Frew, A. M. Thomas, from (A.); July 1, 1918. P. Arbon, from (A.); Aug. 1, 1918. J. J. Wilson; Aug. 29, 1918. E. L. Ardley, G. A. Hutchinson, J. G. Pyrie; Sept. 1, 1918. J. V. Hay, from (O.); Sept. 30, 1918. G. J. Blackmore, from (T.); J. C. Kimmond; Oct. 1, 1918. H. M. Tayler; Oct. 2, 1918. D. H. Houston; Oct. 15, 1918. A. S. Dark, K. H. Leake; Nov. 1, 1918. S. B. Hicks, from (A.); Nov. 14, 1918. (Hon. Capt.) J. H. Hannay; Nov. 22, 1918. J. B. Pirie; Dec. 24, 1918.

Sec. Lieuts. to be actg. Cpts. whilst employed as Cpts.:—G. D. Ashby, (Hon. Lieut.) J. McAllister; Oct. 1, 1918. J. N. Dillon; Nov. 22, 1918. L. Marquard, from (A. and S.); Jan. 13. G. T. Armitage; Feb. 1.

J. P. Cogland (Temp. Lieut., Res. of Cav.) is granted a temp. commn. as Lieut., with seniority from April 1, 1918, and to be actg. Capt. whilst employed as Capt.; Sept. 27, 1918, to Jan. 21.

Lieuts. (A.) to be Lieuts.:—A. Parrish; July 16, 1918. A. H. Hepworth; Sept. 10, 1918. N. W. Robertson, D.F.C.; Oct. 3, 1918. H. M. Harnes; Oct. 10, 1918. T. H. Butler; Nov. 12, 1918. A. G. Storey; Nov. 13, 1918. J. A. Dales; Nov. 14, 1918. A. G. Platt; Nov. 18, 1918. E. E. Hamilton-Jackson; Nov. 20, 1918. E. R. Ortnier; Nov. 25, 1918. W. T. Kuschke; Nov. 26, 1918. H. Goodwin; Nov. 27, 1918. T. S. Bulman; Nov. 30, 1918. H. V. M. Hoskins, S. Thompson; Dec. 3, 1918. A. Cattanach, W. E. Gilbert, O. G. Thomas; Dec. 4, 1918. M. L. James, E. O. Peel; Dec. 5, 1918. L. Taylor; Dec. 9, 1918. (Hon. Capt.) H. O. D. Wilkins; Dec. 16, 1918. P. T. Harris; Dec. 18, 1918. C. L. P. Mullany, B. F. Macdonald, R. J. Thomas; Dec. 19, 1918. J. H. Underwood; Dec. 31, 1918. R. G. Taggart; Jan. 2. (Actg. Capt.) R. C. St. J. Dix, M.C., and relinquishes actg. rank of Capt.; E. S. Smithes; Jan. 9. E. Tasker, A.F.C.; Jan. 24.

Lieuts. (O.) to be Lieuts.:—(Hon. Capt.) J. A. Mansfield; July 1, 1918. N. Smith; July 8, 1918. B. G. Brown; July 16, 1918. J. Paisley; Oct. 4, 1918. R. W. H. Grasdorff; Nov. 7, 1918. (Hon. Capt.) E. Beadon, M.C.; Nov. 19, 1918. G. H. Fozzard; Nov. 22, 1918. H. Shaw; Jan. 3.

Lieuts. to be Lieuts.:—J. H. Pollitt, from (S.O.); Nov. 20, 1918. D. I. B. McCulloch, from (T.); Jan. 8.

The following to be graded for pay as Lieuts. while employed as Lieuts.:—Lieut. A. MacNamara; April 1, 1918. Lieut. E. E. N. Smith, from (T.); Aug. 26, 1918. Capt. H. Sherwood, from (A'ship); Jan. 16.

Lieut. J. F. C. Bennett (Capt., Lond. R., T.F.) is granted a temp. commn. as Lieut., seniority April 1, 1918, and to be hon. Capt.; Sept. 9, 1918.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts.:—G. N. J. Shaw; June 1, 1918. (Hon. Lieut.) G. Watts, from (T.); Aug. 13, 1918. A. Lindsay; Sept. 13, 1918. R. O. Hamilton, from (T.); Sept. 25, 1918. R. N. Lamb; Dec. 18, 1918.

Sec. Lieuts. to be Sec. Lieuts., from (A.):—F. P. Dodsworth; Nov. 17, 1918 (substituted for notification in *Gazette* Feb. 4). Hon. Lieut. W. V. Trubshawe; Dec. 10, 1918 (and to be Hon. Lieut.). R. W. F. Smee; Dec. 16, 1918. Hon. Lieut. D. Millar; Dec. 17, 1918 (and to be Hon. Lieut.). O. M. Smith; Dec. 20, 1918. F. W. B. Anderson; Jan. 24.

Sec. Lieuts. to be Sec. Lieuts., from (O.):—R. E. Linder; Nov. 11, 1918. A. C. Roberts; Nov. 18, 1918. L. J. Edwards; Dec. 8, 1918. Hon. Lieut. C. S. Preston; Dec. 16, 1918 (and to be Hon. Lieut.). C. C. Shelswell; Jan. 9.

Sec. Lieut. T. S. Mobey to be Sec. Lieut., from (K.B.); Nov. 2, 1918.

Sec. Lieut. W. G. Wheatland to be Sec. Lieut., from (A. and S.); Jan. 1.

Sec. Lieut. H. J. Young (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut.; April 1, 1918.

D. S. F. E. Maule-Cole (Hon. Lieut., Ret. List, S.R.) is granted a temp. commn. as Sec. Lieut.; Nov. 1, 1918.

The following are transfd. to Unemployed List:—Sec. Lieut. L. G. H. Aspinall; Jan. 16. Lieut. H. P. O. Broadbent; Jan. 23. Sec. Lieut. G. P. Brown, Sec. Lieut. J. Clubb; Jan. 24. Lieut. T. B. Fraser, Sec. Lieut. W. C. C. Taylor; Jan. 27. Sec. Lieut. E. Aldwinckle, Sec. Lieut. F. Allanson; Jan. 28. Sec. Lieut. E. C. Birkett; Jan. 29. Lieut. J. B. H. Tate; Jan. 31. Lieut. (actg. Capt.) C. E. Bagram, Lieut. D. S. Newton; Feb. 1. Sec. Lieut. J. S. Betterton, Sec. Lieut. F. W. T. Davis; Feb. 2. Sec. Lieut. (actg. Lieut.) T. Hobson; Feb. 3. Sec. Lieut. (Hon. Lieut.) (actg. Capt.) J. G. Beckham; Feb. 4. Capt. R. D. Cilinch, Lieut. E. J. Dowty; Feb. 5. Sec. Lieut. N. K. Lawton; Feb. 7. Lieut. W. J. C. Brown; Feb. 8. Lieut. R. T. Fryett, Sec. Lieut. S. Gaskell, Sec. Lieut. R. Tompson; Feb. 9. Sec. Lieut. C. R. Millbourn, Sec. Lieut. J. McLennan, Sec. Lieut. L. J. Martyr; Feb. 11.

Maj. W. G. Chambers relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Feb. 22.

Lieut. H. Townsend relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Feb. 22.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—E. G. Hellard, A. R. H. Hora; Feb. 22.

The initials of R. E. Sothcott are as now described, and not as stated in *Gazette* Jan. 24.

The notification in *Gazette* of Sept. 17, 1918, concerning Sec. Lieut. A. E. Houghton is cancelled.

The notification in *Gazette* of Sept. 6, 1918, concerning Lieut. A. C. Dent is cancelled.

#### Technical Branch.

Maj. (actg. Lieut.-Col.) G. P. Grenfell, D.S.O., to be actg. Lieut.-Col. (Grade A), and to be actg. Col. whilst employed as Comdt. Wireless Experimental Establishment; Dec. 12, 1918.

Capt. (actg. Maj.) C. H. Rowe retains the actg. rank of Maj. whilst employed as Maj. (Grade A), from (S.O.); May 23, 1918, to Sept. 10, 1918.

Capt. J. D. Rennie to be actg. Maj. whilst employed as Maj. (Grade A); Dec. 29, 1918.

Cpts. to be actg. Maj. whilst employed as Maj. (Grade B):—A. B. Murray; Aug. 18, 1918. L. S. Metford; Sept. 16, 1918.

Capt. A. H. Peake-Jones to be graded for purposes of pay as Capt. whilst employed as Capt. (Grade A); Jan. 1 (substituted for notification in *Gazette* Feb. 7).

Cpts. to be Cpts. (Grade B):—O. H. Mason, from (Ad.); Oct. 1, 1918. A. J. Carlow, from (A.); Oct. 2, 1918.

Lieut. (actg. Capt.) F. J. Cooke retains the actg. rank of Capt. whilst employed as Capt. (Grade B), from (Ad.); Oct. 1, 1918.

Lieuts. to be actg. Cpts. whilst employed as Cpts. (Grade A):—J. W. Askham; April 22, 1918. E. J. Phelps; July 1, 1918. W. J. Cooper; Aug. 1, 1918. A. H. Meldrum, R. J. Shanks; Sept. 1, 1918. G. P. Achurch, M.B.E.; Sept. 30, 1918. C. D. Fairweather, C. J. C. Gunn, T. McI. Mackay; Oct. 1, 1918. W. C. Bagnall, G. Baillie (substituted for notification in *Gazette* Jan. 31). J. P. Burden; Nov. 1, 1918. W. F. Floyd; Dec. 1, 1918. A. L. Pearce; Jan. 1.

Lieuts. to be actg. Cpts. whilst employed as Cpts. (Grade B):—H. Bristow, S. A. Mitchell; July 1, 1918. E. Gayton, H. V. Page; Aug. 1, 1918. F. Freeman, from (Ad.); Aug. 15, 1918. G. E. Phillips; Sept. 2, 1918. J. A. Butcher; Sept. 18, 1918. C. A. Lawlor; F. D. Williams, from (Ad.); Oct. 1, 1918. E. H. Jones, P. H. Paul (substituted for notification in *Gazette* Jan. 31). A. E. Rampton; Nov. 1, 1918. D. Low; Nov. 14, 1918. F. H. Bartlett; Nov. 30, 1918.

Sec. Lieut. P. V. Davies to be actg. Capt. whilst employed as Capt. (Grade A); Nov. 1, 1918.

Sec. Lieuts. to be actg. Cpts. whilst employed as Cpts. (Grade B):—(Actg. Lieut.) E. A. Tottle; July 1, 1918. (Actg. Lieut.) A. E. Marriott, from (Ad.); Aug. 15, 1918. (Hon. Lieut.) (actg. Lieut.) J. A. Hone, (Actg. Lieut.) W. S. C. Stephens; Oct. 4, 1918. A. H. Waterman; Oct. 15, 1918. W. W. Brabner, T. Campbell; Nov. 1, 1918. T. W. King; Dec. 1, 1918. H. Barnes-Moss; Feb. 4.

Lieuts. (O.) to be Lieuts. (Grade A):—R. Robertson; June 21, 1918; H. R. Stewart; Sept. 25, 1918. F. L. Steben; Oct. 1, 1918.

Lieut. P. S. Taylor to be graded for purposes of pay as Lieut. (Grade A); Nov. 1, 1918.

Lieuts. to be Lieuts. (Grade B):—G. W. E. Baker, from (A.); April 1, 1918. T. A. M. S. Lewis, from (A.); Feb. 3.

Lieuts. to be graded for purposes of pay as Lieuts. (Grade B):—T. H. Cooper; June 1, 1918. R. W. Jefferson; Jan. 1.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts. (Grade A):—S. T. Kemp, D. G. Robinson; April 1, 1918. S. E. W. Taylor; June 1, 1918. G. R. Eaton, A. E. Fisher; Aug. 1, 1918. (Hon. Lieut.) V. P. Spurway; Aug. 14, 1918. S. Barrow; Oct. 1, 1918. R. Locke; Oct. 2, 1918. W. F. Arnold; Oct. 18, 1918. Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts. (Grade B):—(Hon. Lieut.) W. J. Rice; April 1, 1918. (Hon. Lieut.) J. A. Hone, W. S. C. Stephens; April 8, 1918. W. J. Scott; July 15, 1918. O. Fielding-Clarke, R. W. Hogg; Aug. 1, 1918. C. E. Kitchenside, R. S. MacD. Salt; Sept. 1, 1918. N. C. Raffin, from (Ad.); Sept. 19, 1918. L. V. Mackenzie, P. Merrivale; Oct. 1, 1918. (Hon. Lieut.) J. C. Lathan, E. A. Sullivan; Nov. 1, 1918. J. Anderson, H. H. Fanthorpe, H. S. Rogers, G. W. Sturman; Nov. 15, 1918.

Sec. Lieut. E. Chesterfield to be Sec. Lieut. (Grade A), from (Ad.); Jan. 23.

Sec. Lieuts. to be Sec. Lieuts. (Grade B), from (Ad.):—(Hon. Lieut.) W. V. Gray, and to be Hon. Lieut.; Oct. 1, 1918. W. O'Donoghue; Jan. 21.

P. E. Stubbs is granted a temp. commn. as Sec. Lieut.; April 1, 1918.

Flight Cadet 1913 A. L. Parry is granted a temp. commn. as Sec. Lieut. (Grade A); Oct. 24, 1918.

Lieut. J. MacDiarmid (Lieut., R.N.) relinquishes his commn. on ceasing to be employed; Dec. 2, 1918.

The following are transfd. to Unemployed List:—Capt. G. K. G. Kerr; Jan. 2. Sec. Lieut. O. P. Aarvold; Jan. 19. Capt. H. French; Jan. 20. Lieut. (actg. Capt.) G. P. Achurch, M.B.E.; Jan. 23. Lieut. A. W. Hamlin; Jan. 26. Lieut. (Hon. Maj.) R. A. Constantine, Sec. Lieut. C. S. M. Raikes; Jan. 27. Sec. Lieut. (Hon. Lieut.) E. J. C. Bockett; Jan. 28. Sec. Lieut. R. G. Nelson; Jan. 29. Capt. J. Latta; Jan. 31. Lieut. J. Cawley, Lieut. T. P. Francis, Lieut. H. B. Golding; Feb. 1. Lieut. R. W. Jefferson; Feb. 2. Sec. Lieut. (Hon. Lieut.) S. Davis, Lieut. R. W. L. Phillips; Feb. 4. Sec. Lieut. P. C. Barratt, Capt. W. N. Cronshaw, Sec. Lieut. (Hon. Lieut.) C. E. Kennedy, Capt. D. A. Pearson, Sec. Lieut. (Hon. Lieut.) H. C. Short; Feb. 5. Capt. R. R. Alexander, Capt. C. Ingram; Feb. 6. Sec. Lieut. (actg. Lieut.) D. M. Baylis, Sec. Lieut. S. Curzon; Feb. 8. Sec. Lieut. A. C. Merrill, Maj. F. R. Samson; Feb. 9. Lieut. F. H. Kelf; Feb. 10. Lieut. S. O. Hillman; Feb. 11. Capt. C. B. Gasson, Lieut. H. W. Pollock; Feb. 16. Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) E. A. Laurie; Feb. 21.

Capt. C. Tollemache relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Feb. 22.

Sec. Lieut. F. A. Worlidge relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Feb. 22.

#### Physical Training Branch.

To be actg. Cpts. whilst employed as Cpts.:—Sec. Lieut. A. J. Adams, from (T.); June 1, 1918 (substituted for notification in *Gazette*, Feb. 11, concerning Sec. Lieut. A. G. Adams. Lieut. W. H. Evans; June 15, 1918.

Sec. Lieut. (Hon. Lieut.) C. Wilson, from (T.); Jan. 21.

#### Medical Branch.

Lieut.-Col. T. D. C. Barry, C.B.E., is granted the actg. rank of Col.; Oct. 2, 1918.

The following Maj. are granted the actg. rank of Lieut.-Col.:—R. H. McGiffin, G. D. Bateman, B. R. Bickford, D.S.O.; Oct. 2, 1918.

The following Cpts. are granted the actg. rank of Maj.:—W. Darling, M.C., J. M. Kirkness, T. S. Rippon, B. A. Playne, D.S.O., P. H. Hadfield, R. H. Knowles, P. L. Moore, A. A. Atkinson, J. J. C. Hamilton, F. C. Jobson, M. R. Dobson, J. MacGregor, M.C., F. N. B. Smartt, A. A. Bisset, H. Stedman, L. C. M. Wedderburn, H. M. S. Turner, H. E. Whittingham, A. Scott-Turner, C. J. G. Taylor, O. H. Gotch, H. G. Anderson, M.B.E., H. A. Hewat, W. Enraght, D. Ranken; Oct. 2, 1918.

Capt. (actg. Maj.) C. E. Thwaites retains the actg. rank of Maj. while employed as Maj. from (S.O.); Feb. 12.

P. O. Moffat (Temp. Capt., R.A.M.C.) is granted a temp. commn. as Capt.; Oct. 1, 1918, seniority from May 14, 1918.

The following Lieuts. are granted the actg. rank of Capt.:—C. H. Vernon, G. W. Harbottle, L. C. Broughton-Head; Oct. 2, 1918.  
R. H. Turner is granted a temp. commn. as Lieut.; Feb. 18.  
Capt. D. Ross is transfd. to unemployed list; Feb. 1.

## Memoranda.

Hon. Lieut. R. J. Grant to be Hon. Capt. while holding a special appointment at the Ministry of Munitions; May 1, 1918.  
Lieut. T. Griffiths is granted the hon. rank of Capt.  
Sec. Lieut. H. S. Downs to be Lieut.; June 16, 1918.  
Sec. Lieut. G. Carruthers to take rank and precedence as if his appointment as Sec. Lieut. bore date Nov. 28, 1918.  
Lieut. (actg. Maj.) F. W. M. Pedley relinquishes the actg. rank of Maj. on ceasing to be specially employed; Nov. 28, 1918.  
Maj.-Gen. Sir W. S. Brancker, K.C.B., A.F.C., retires on retired pay; Jan. 13.  
The following are transfd. to unemployed list, from (S.O.):—Capt. H. W.

J. Chipchase; Feb. 2. Maj. (actg. Lieut.-Col.) C. A. J. Butter, Lieut.-Col. L. H. Strain, D.S.C., Lieut. (actg. Capt.) A. V. Sale; Feb. 7; Capt. R. C. Boustead, Lieut. (actg. Capt.) A. D. Finney; Feb. 11. Maj. Hon. L. G. W. Guest; Feb. 17.

Capt. (actg. Maj.) L. L. Batten (Glouc. Yeo., T.F.) relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Maj.; Feb. 22.

## Royal Flying Corps (Military Wing).

*London Gazette Supplement, February 20.*

Equipment Officers, 2nd Class.—From the 3rd Class, and to be Temp. Lieuts. whilst so employed:—Temp. Sec. Lieut. H. C. C. Gates, Gen. List.; Oct. 23, 1917. Sec. Lieut. R. J. Saunders, S.R.; March 15, 1918.

*London Gazette Supplement, February 21.*

Flying Officers.—Temp. Sec. Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—F. W. Sriver; March 12, 1918. M. Fearman; March 30, 1918 (substituted for notification under Flying Officers (Observers) in *Gazette* Dec. 5, 1918).

## The Lost Night Bomber

SOME details as to how a new Handley Page night bombing machine fell into the hands of the Germans on its first flight to France are now disclosed in the following account given by a member of the crew. He says:—

"We left England at 11.30 a.m. on January 1, 1917. When over the Channel we ran into very foggy weather, and came down to a lower altitude to find the coast, but failed. The fog went right down to the sea. We rose clear of it at 5,000 ft., but ran into what was apparently a thunderstorm. This must have made our compass defective. We decided that we had better return to England, but the weather appeared to be growing worse, and we turned and made for France, steering a little west of south in hope of clearing the fog farther inland.

"When we knew we must be over land we came down to a low altitude to find a landing. Flying at about 150 ft., we noticed a church steeple, and made for it as representing some village where we could get information as to our whereabouts, and landed in a field near by. Not a soul was to be seen. We waited for ten minutes or so, but no one came, so the pilot and the observer set off walking and found some French children. They were unable then to ascertain the fact that place, as we afterwards learned, was called Chalandry. While the party was distributed some German soldiers who had seen the machine arrive rushed out, and captured the remainder before they had time to fire the machine or even

to realise that they were in territory occupied by the enemy."

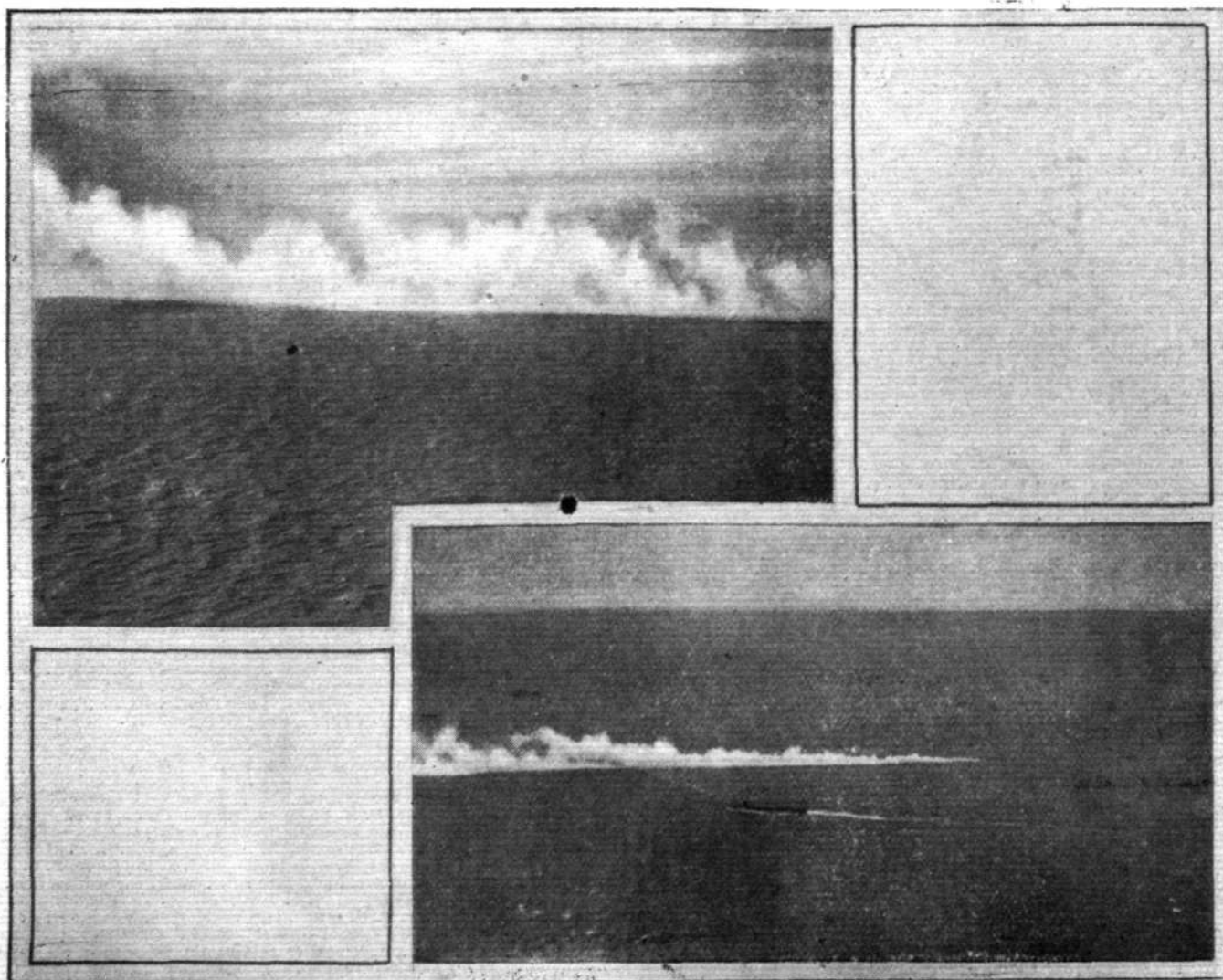
## France Wanting Rigid Airships

ALTHOUGH up to the present France has done very little in the way of rigid airships that may be rectified before long. Interviewed by the *Excelsior*, M. de Kerguezec, Reporter of the Naval Estimates, laid great emphasis upon the necessity of France possessing airships of this type on the Atlantic and Mediterranean coasts, for maintaining communications between France and Toulon, Bizerta, Algiers, and even Senegal. He urged that France should follow the example of Great Britain, which was resolutely building large airships, and was apparently disposed to set about the construction of units containing 100,000 cubic metres of gas.

Although he regretted they were so much behind Great Britain in that respect he suggested they could catch up by taking advantage of the renewal of the armistice to force the Germans to surrender their Zeppelins, which could be kept in the existing sheds at Maubeuge, Metz, and Namur, and on the banks of the Rhine, and could be taken rapidly to pieces and transferred to France.

## For High and Fast Flying

WONDERFUL messages have come from Paris regarding a new turbine invented by Dr. A. Rateau; but it appears that the invention really consists of a turbine pump, designed to feed the engines of aeroplanes with compressed air, when flying at great heights.



AS SEEN FROM OUR AIRCRAFT.—Top photo.: A smoke-screen with trawler in foreground and bottom photo.: H.M.S. "Onslaught" running into a smoke-screen, with a coastal boat beyond.



## SIDE-WINDS

WHERE officialdom, like the law, looks uncommonly like being on a par with the asinine quadruped is shown by this lesson in Somerset House procedure. Mr. G. H. Mansfield, Managing Director of the Motor and Aircraft Supplies Co., Ltd., writes us as follows:—"Mr. Ascol has changed, or rather added to, his company's name. At Somerset House, W.C., before the Registrar of Joint Stock Companies, on February 14 (Valentine's Day), Mr. Ascol obtained permission to change the name of the company to the Motor and Aircraft Supplies Co., Ltd. A request has been made to call the company 'Ascol,' Ltd., but the Board of Trade said that 'Ascol' neither indicated the business done nor the name or names of the directors. The fact that the word is part of our trade mark did not help us within the meaning of the Act. Had the managing director changed his name by deed-poll to 'Ascol,' which he could do, the company could then be known as 'Ascol,' Ltd.—such is the law. In order to save our customers such a mouthful as our present title we shall continue to make ourselves known as 'Ascol' House, and by this name shall we be known abroad in foreign lands and at home."

WE understand from Messrs. Alexander Duckham and Co., Ltd., that Sir Arthur Duckham, K.C.B., Director-General of Aircraft Production and member of the Air Council, has joined the board of that firm.

THE East London Rubber Co. (Sheffield Branch) have appointed Mr. B. J. Murrin (of Newcastle-on-Tyne) to represent them on the ground covered by the late Mr. E. Teasdale (killed in the great War). This ground includes Northumberland, Durham, Cumberland, Westmoreland, North Lancashire, and the East Riding of Yorkshire. Mr. Murrin is now starting out on his first journey on behalf of after-War business. They have also appointed Mr. W. R. Watson (of Sheffield) to represent them in South Lancashire, Cheshire, Shropshire, Staffordshire, North Wales, formerly covered by the late Mr. E. B. Brettel.

THE annual staff dinner of Messrs. Handley-Page, Ltd., at Saturday, at the Connaught Rooms, was a cheery affair. "H. P." was in the chair, supported by Mrs. Handley-Page; Lord Morris, of Newfoundland, who is now a director of the firm; the Earl of Hardwicke, Maj. F. R. McMahon, D.S.O., and the heads of departments.

In proposing the toast of "The Firm," Mr. R. S. Hubbard, works manager, said that during the past year the total number of employees had increased to four times what it was. They had now got a very fine works and a splendid aerodrome which looked like being used extensively in connec-

tion with commercial aviation. He also referred to the great success of the V 1500 machine, and said he thought the Germans must have second sight, and having seen the V type bomber coming decided to sign the armistice.

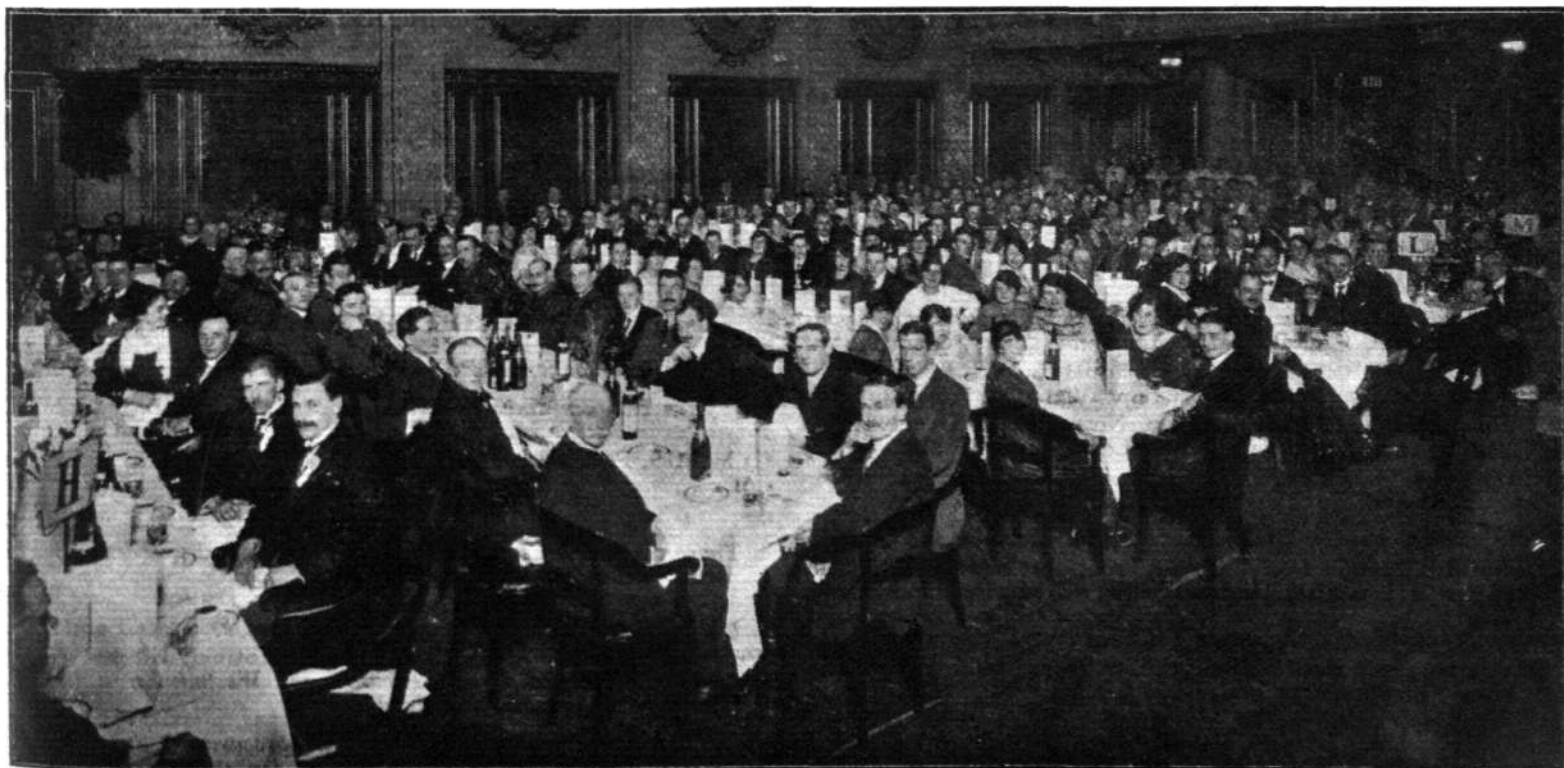
Mr. Handley-Page was in his happiest vein in replying to the toast, and with great pride outlined several of the recent achievements of H.P. machines, such as the flight to India, the trip from Belfast to the East Coast, the carrying of 40 passengers over London, etc. He pointedly remarked that all these were not things they were going to do but had actually been accomplished. Referring to the part played by H.P. machines in the War, he said that the first blow in Genl. Allenby's campaign was struck by an H.P., which, bombing the central signal station of the Turkish headquarters, prevented messages being sent to the various units. The American attack at St. Mihiel was also preceded by operations by a squadron of H.P. machines.

Many of them were asking when were they going to fly the Atlantic, and when were they going to start a passenger service? All he would say was "Wait and see." They might take it from him, however, that if a long flight is possible anywhere the old firm would always be well represented. With regard to passenger services, they had made arrangements with Allied companies abroad, and as soon as it was possible they would go ahead. In four months one of their machines operating to the Continent from Folkestone had carried 474 passengers without mishap. Referring to the profit-sharing scheme which the firm had inaugurated, he said it was very difficult to estimate what profits they were going to make, and they needed to go carefully, but he made it clear that the firm would do what was just and right. He said that Lord Belper, as well as Lord Morris, had joined the board of directors.

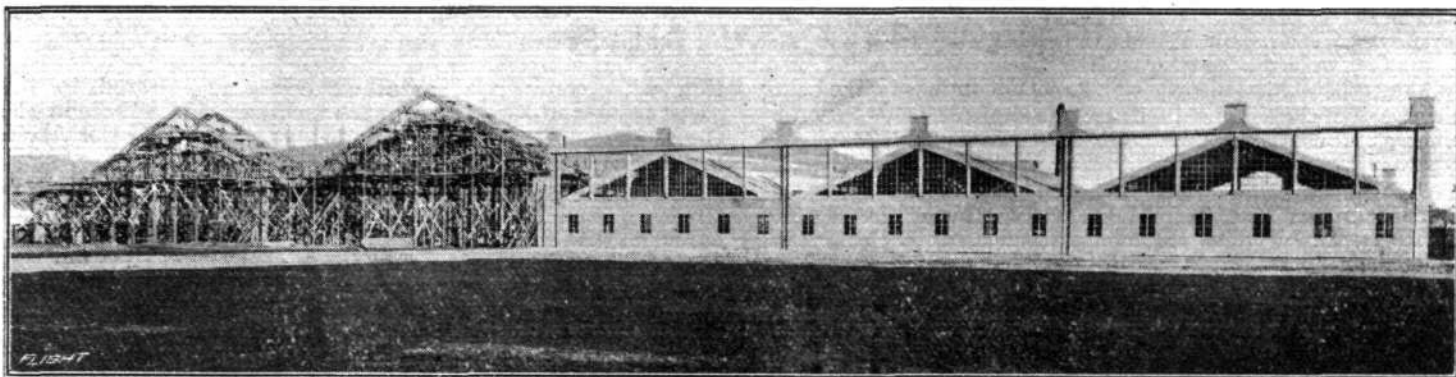
The other speakers were the Earl of Hardwicke, Maj. F. R. McMahon, D.S.O., Lord Morris, and Mr. F. Kimber Bull, and during the evening an excellent musical programme was given by Miss Ruby Wilson, Miss Amy Brook, Miss May de la Grange, Miss Evelyn Green, Mr. Leslie Walker, Mr. Henry Turnpenny, Mr. Llewellyn Evans, and Mr. Bobbie Comber.

His many friends in the trade will regret to hear that Mr. F. A. Smalley, the manager of Messrs. Joseph Owen and Son, Ltd., the timber specialists, of Borough High Street, passed away on February 20 from pneumonia after a very brief illness.

It has been an open secret for quite a long time that Messrs. W. G. Tarrant, of Byfleet, have been engaged upon the construction of a super triplane, and we hope shortly to be able to give some detailed particulars of this machine.



The Handley-Page Dinner at the Connaught Rooms



**FIAT AEROPLANE SHEDS.**—The front of each shed is in one section, and can be raised or lowered by mechanical means.

### NEW COMPANIES REGISTERED

**R. BOVIER AND CO., LTD.**—Capital £5,000, in £1 shares (3,000 "A" and 2,000 "B"). Acquiring business of mechanical, scientific and aeronautical engineers, formerly carried on by Rosa Bovier and F. Leroy, as "R. Bovier and Co.," at Kingsgate Place, Quex Road, Kilburn, N.W. 6; also to manufacture rangefinders and indicators, aircraft accessories, etc. First directors: Armand Bovier and F. Leroy.

**DISCHARGED SAILORS', SOLDIERS' AND AIRMEN'S CO-OPERATION, LTD.**, Crosby House, High Street, Hounslow.—Capital, £15,000, in £1 shares. Storekeepers and universal providers. First directors: L. H. Neal, W. A. Jeal, H. Harries, T. W. H. Sarll. All the above are discharged soldiers except H. Harries, who is described merely as "soldier."

**HAMER HOLMES, LTD.**, Leeds.—Capital £10,000, in £1 shares. Manufacturers of aircraft (as regards both heavier and lighter-than-air machines), propellers and accessories, etc. First directors:—J. W. Hamer and W. Holmes.

**NEWINGTON ELECTRICAL CO., LTD.**—Capital £10,000, in £1 shares. Acquiring business of the Newington Electrical Co., carried on by J. D. Caig at 16, Newington, and 24, Bolton Street, Liverpool, engineers, motor car and aeroplane builders. First directors: A. Lloyd and J. D. Caig (permanent).

**STABILISER (AERONAUTICS), LTD.**, 6, Cherry Street, Birmingham.—Capital £1,000, in £1 shares. Acquiring patent and other rights of The Knudsen Stabiliser for aeroplanes or aircraft, now belonging to Hans Knudson, of 49, Thrale Road, Streatham Park, S.W.

### PUBLICATIONS RECEIVED

*Tables of British Decimal Coinage, Metric and British Weights and Measures.* By A. J. Lawson, M.Inst.C.E. The British Italian Commercial Association. London: Eyre and Spottiswoode, Ltd., 6, Great New Street, Fetter Lane, E.C. Price 5s.

*Standard Tables and Equations in Radio Telegraphy.* By Bertram Hoyle, M.Sc.Tech., A.M.I.E.E. London: The Wireless Press, Ltd., Marconi House, Strand. Price, 9s. net.

*The Bulletin of the Federation of British Industries.* Lyons Fair Edition, March, 1919. London: The Federation of British Industries, 39, St. James's Street, S.W. 1.

*The A.B.C. of Aviation.* By Capt. Victor W. Page, Sig.R.C., A.S., etc. New York: The Norman W. Henley Publishing Co. London: Crosby Lockwood and Son. Price 12s. 6d. net.

### Catalogues

*A New Era in Motoring. Smith's Starting and Lighting System, Speedometers, Lamps, etc.* S. Smith and Sons (Motor Accessories), Ltd., 179-185, Great Portland Street, W. 1.

*"Enots" Patent Cork-Disc Seated Petrol Cocks, and other Aircraft Components.* Benton and Stone, Ltd., Bracebridge Street, Birmingham.

*Archdale Drilling and Milling Machines.* James Archdale and Co., Ltd., Ledsam Street, Birmingham.

*"The War Record of a Wonderful Invention."* Triplex Safety Glass Co., Ltd., 1, Albemarle Street, London, W. 1.

### Aeronautical Patents Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m = motors.

#### APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published February 27, 1919

- 8,065. PILKINGTON BROS. and L. WEST. Mirrors for use on aircraft, etc. (122,655.)  
12,051. T. HARVEY and T. G. TULLOCH. Means for communicating to and from aircraft. (122,657.)

#### APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published February 27, 1919

- 1,556. BRITISH EMBLITE CO. and J. N. GOLDSMITH. Means for reducing visibility of aeroplanes. (122,686.)  
1,707. R. W. BIRKETT. Aerial propellers. (122,693.)  
2,106. S. V. DE BOLOTOFF. Means to receive strut-ends in aeroplanes, etc. (122,710.)  
3,742. R. FIELD. Spirit, etc., level for aircraft. (122,732.)  
13,581. B. A. FIELD. Hubs for aeroplanes, etc. (122,795.)

### Index and Title Page for Vol. X.

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## FLIGHT

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